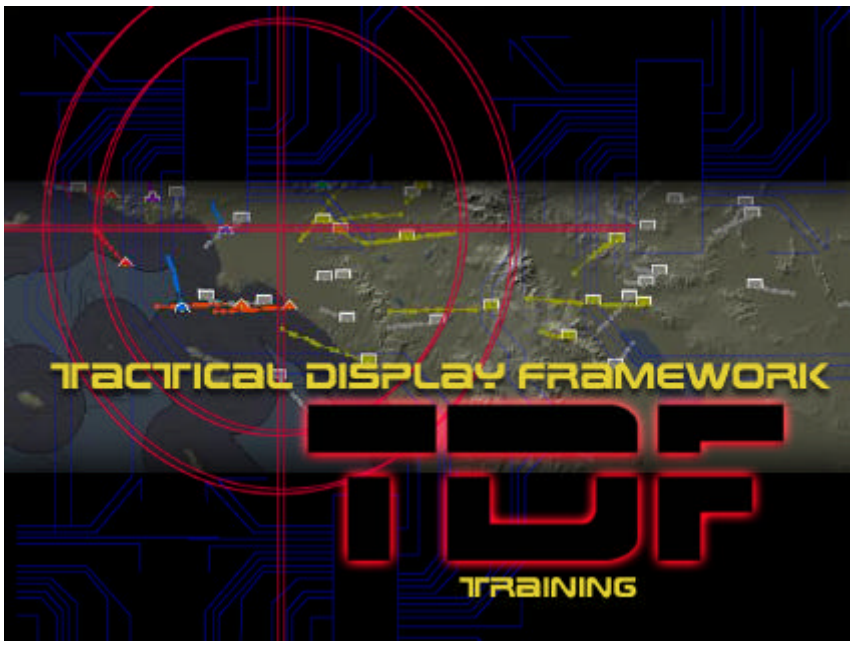
Tactical Display Framework

User's Manual



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1 INTRODUCTION

The Tactical Display Framework (TDF) is an adaptable, graphical, object-oriented Command and Control (C^2) system capable of supporting the growing needs of the tactical user. To promote portability and reusability, all software is written in the Java programming language. In fact, TDF has been certified by Sun Microsystems ® as '100% Pure Java.' Although TDF can execute in standalone mode, it is typically connected to an information source via a socket connection or a Common Object Request Broker Architecture (CORBA)-compliant interface.

Solipsys released TDF Version 3.4 on January 9, 2002 as an upgrade to the previous 4 series releases. TDF 3.4 now includes an intelligent doctrine application for alerts and automation. The Doctrine application is a solution to automated alerts. Doctrine intelligently processes user-configurable settings to produce reliable results that can be based on track behaviors. A new Marker List application incorporates proven techniques to enable improved user-interaction. Details and Tags Editors have been replaced by a unified Details Editor that provides greater capacity to display information on the main display. Performance has taken another leap forward. Among other system additions, TDF now support a sophisticated dynamic memory allocation system, which has drastically reduced sensor memory requirements.

TDF Version 3.4's peak performance is achieved using Java Developer's Kit Version 1.3 (JDK 1.3.1) under Windows NT 4.0/2000 although it will function in JDK 1.2 and Version 1.1 of the Java Foundation Classes (JFC 1.1 and Swing 1.1.1). Since TDF is implemented in Java, its portability is outstanding: TDF will run without modification on any machine that supports the Java Virtual Machine (JVM). To date, TDF has been hosted successfully on a variety of Intel machines running Windows95/98/NT/2000 and Sun, HP, DEC, IBM, and SGI platforms running UNIX variants. Minimum PC requirements for Windows 98/2000/NT 4.0 machines and UNIX boxes are as follows:

PC Minimum Requirements	**UNIX Minimum Requirements**
Pentium III 450 MHz 256 MB RAM 32 MB Graphics Card 2 GB free hard disk space	Java 2 Platform (Solaris 7.0, IRIX 6.5, HP/UX 10.0 etc.) 256 MB RAM 2 GB free hard disk space
Preferred Minimum Requirements	**Preferred Minimum Requirements**
Windows NT 4.0/Windows 2000 Pentium III 800 MHz (JDK 1.3) 256 MB RAM 32 MB video card 2 GB free hard disk space	Latest Operating System (with Native Thread Support) 256 MB RAM 2 GB free hard disk space

2 JUMP-START BASICS

2.1 TDF Display

The first step to understanding TDF is to familiarize oneself with its major components. The top-level window is divided into three main areas (Figure 1):

- The **menu bar**, at the top, lists the available applications.
- The **main display**, in the middle, displays user-selectable vehicular dynamic symbols overlaid on high-resolution, digitized map products.
- The **control bar** along the bottom provides quick access to a variety of mini-displays and commands.

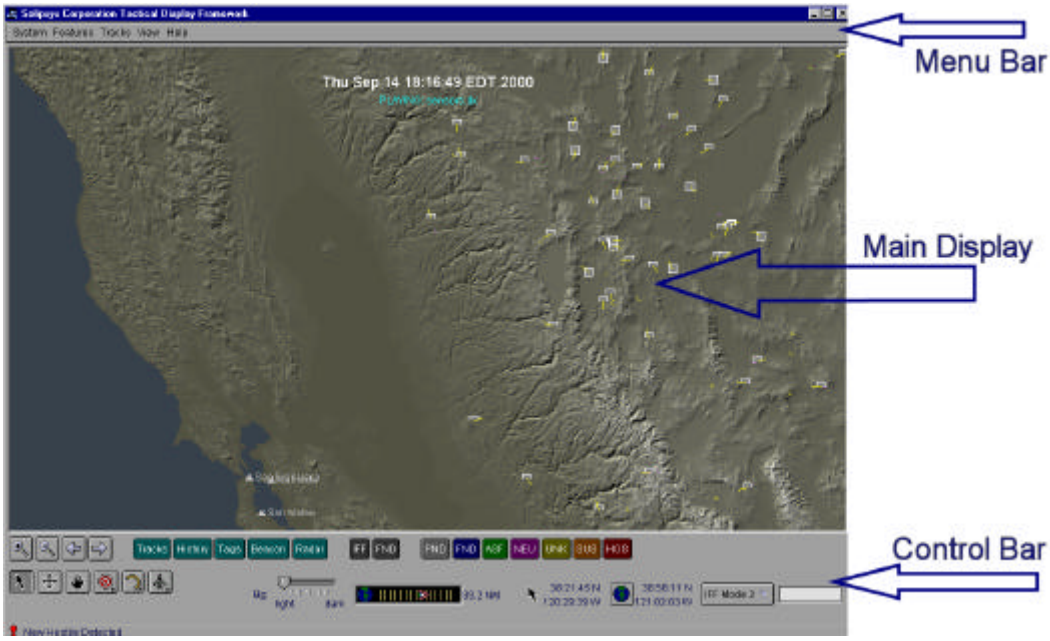

Figure 1. TDF Main Display

This document may use terminology that differs from what an operator normally uses. One example of this is TDF's main display. In fact, the main display was referred to as the TACSIT in the most recent release of TDF. The US or an international armed force may use the equivalent terms, such as SiD (Situation Display), Common Operational Picture (COP), or Common Tactical Picture (CTP). The main display and other perhaps unfamiliar terms will be defined and used throughout this document and any newly generated documentation.

Additionally, some screen examples in this document may look different from a user's screen. The look and feel can be radically changed to other styles in the Preferences (System>>Preferences) application. Since TDF is so flexible and reconfigurable, the

configurations used in this document may vary from the user's build. If a user would like to extend TDF's capability, please contact Solipsys Corporation for more information.

The other portions of TDF can be toggled on and off easily to use the main display in full screen. Table 1 lists these options and other keyboard shortcuts.

Table 1. Keyboard Shortcuts

Keyboard Shortcuts	Action
F1	Help Viewer
F2	Reset Pointer Control
F4	Toggle Control Bar Display
F5	Toggle Menu bar Display

2.2 Using System Features

Table 2contains a list of commands and applications found under the System menu. Most of the following commands affect TDF globally.

Table 2. System Features

Command	Action
Open	Opens saved files that contain certain settings, but the save/open does not restore/persist certain applications, such as view location and markers
Save	Saves the current settings of the main display
Collaborate	Control Panel for Net Meeting
Preferences	Allows users to configure animation detail, appearance, bearings, network distribution, and pointer options.
Print	Lists and enables printing of various views
Status	Displays system status
Reset	Clears all sensor and track information in database and resets selected applications to default
Close all	Closes all applications except for the Main Display
Quit	Closes all applications and exits
Unique Battle Lab Command	Action
Import	Imports Air Tasking Order (ATO) databases into system
MSCT Control	Enables user-specified, identity-based data control, current configuration information, user-specified geo boundaries, and lists high priority tracks and interfaces

2.3 Getting Around the Main Display

2.3.1 Brightness Slider

A user can drag the slider to the right to darken the background but does not darken the tracks. The tracks are highlighted by the contrast with the background.

Figure 2. Brightness Slider

2.3.2 Range Scale

After a user knows the component parts of the TDF Display, understanding the various methods of map navigation is the next step.

Changing the range:

1. Select a tick mark on the icon (Figure 3).
   Or
2. Drag the eye icon right (zooms out) or left (zooms in) to the desired range scale.

Figure 3. Range Scale

2.3.3 Using Pointer Mode

Centering the main display on a selected position:

Double-left click (<Ctrl> + left-click) on the main display to recenter it.

Zooming in and out of an area:

1. Double left-click (<Ctrl> + left-click) at a desired screen center position.
2. Drag outward to increase its size and inward to reduce it; the main display will zoom in on the defined area.
3. The click and drag stroke (click + hold + drag) will be mentioned frequently in this document.

The rubberbanding stroke (a type of click and drag stroke) allows a user to zoom in or out on a particular section of the earth by expanding or shrinking a yellow rectangle. This

rubberbanding also displays a range value for the rectangle. This stroke can only be accomplished with the pointer (Figure 4).

Figure 4. Arrow Pointer (default)

2.3.4 Using Pan Mode

Panning across an area:

Double left-click (<Ctrl> + left-click) on the main display and drag the mouse in a desired direction.

Zooming in and out of an area:

Middle double-click (<Ctrl> + <Alt> + left-click) on the main display and drag the pointer up to zoom in or drag it down to zoom out.

Figure 5. Pan Icon

2.3.5 Using Drag Mode

Moving around the position on the screen:

Double left-click the cursor, the screen will move in the direction of the mouse.

Zooming in and out of an area:

Double left-click (or Hold <Ctrl> + <Alt>) left-click and drag up to zoom in and down to zoom out. The screen center position does not change when the zoom feature is used in the drag mode.

Figure 6. Drag Icon

Manipulating the main display using the keyboard:

A list of default, navigation commands appears in Table 3.

Table 3. Navigation Commands

Left Arrow or J	West
Right Arrow or L	East
Up Arrow or I	North
Down Arrow or K	South
+	Zoom In
-	Zoom Out

2.4 Hooking Tracks

TDF supports multiple hooks, primary (encircled) and secondary (ensquared). In both groups, one object is considered the active hook and is prominently highlighted (Figure 7). All known information of the actively hooked track is displayed in details windows located in the upper corners of the main display.

Hooking primary tracks:

1. **To hook one track:** Left-click on the track.
2. **To hook multiple tracks:** <Shift> + left-click and drag. A green box will enclose all hooked tracks; tracks are hooked upon the release of the mouse button.
3. **To unhook a track:** Left-click to unhook all primary tracks.

Figure 7. TDF Hooked Tracks

Hooking secondary tracks:

- **To hook one secondary track:** Middle-click (<Alt> + left-click) on the track.
- **To hook multiple secondary tracks:** <Shift>, middle-click, and drag (<Alt> + <Shift> + left-click and drag).
- **To unhook secondary tracks:** Middle-click (<Alt> + left-click) on map not object.

Table 4. Hook Reference

Single Hook (Selection)	
Mouse Operations	Action
Left-click	Primary Hook
Left-click elsewhere on display	Unhook Primary
Middle-click or <Alt> + left-click	Secondary Hook
Middle-click or <ALT> + left-click elsewhere on display	Unhook Secondary
Group Hook (Multiple Selections)	
Mouse Operations	Action
<Shift> + left-click + Drag	Primary Group Hook
Left-click elsewhere on display	Unhook Primary Group
<Shift> + middle-click or <Alt> + <Shift> + left-click	Secondary Group Hook
Middle-click or <ALT> + left-click elsewhere on display	Unhook Secondary Group

Tracks can also be hooked using the Hook Application: <Ctrl>+K, the Control Bar, and Menu Bar (Tracks>>Hook) all provide the Hook Application. Figure 8 illustrates the hook application found in the Control Bar.

Using the Hook application:

- Choose a category, such as CALLSIGN, Display Track Number (DTN), Joint Track Number (JTN), Cooperating Unit (CU), Identify Friend or Foe (IFF), to specify a hook.
- Insert information appropriate to the category into the text field.
- Use a single asterisk (*) by itself to hook all objects contained within a certain condition, such as all tracks with a CALLSIGN.

Figure 8. Hook Application

2.5 Details

Details and tags are pop-up windows containing configurable information that appear on the main display. As shown in Figure 9, details can appear when a track is selected or rolled over. If multiple tracks are primary hooked, a detail window will darken and two arrows and a menu icon will appear in the window. Using either the Page Up or Page Down keyboard buttons for primary hooks (Shift + Page Up or Page Down for secondary hooks) or the small arrows in the Details windows allows the operator to scroll through the list. The menu icon gives a list of hooked objects, so the user can jump to the wanted track without cycling through all the hooked tracks. When the pointer rolls over a track, a pop-up window appears in the lower left portion of the main display. This is called rollover. When a track is hooked, the windows appear in the upper-left (Primary hook) and upper-right (Secondary hook) of the main display. This is a superb way of gaining track information without cluttering the display.

Tags are windows that appear near the track or marker. Once the tags are configured, they can be cycled with use of the Tags button in the upper control bar. To configure details and tags, use the Details Editor (Features>>Details) in the main menu bar and follow directions in the Details Editor section of this document.

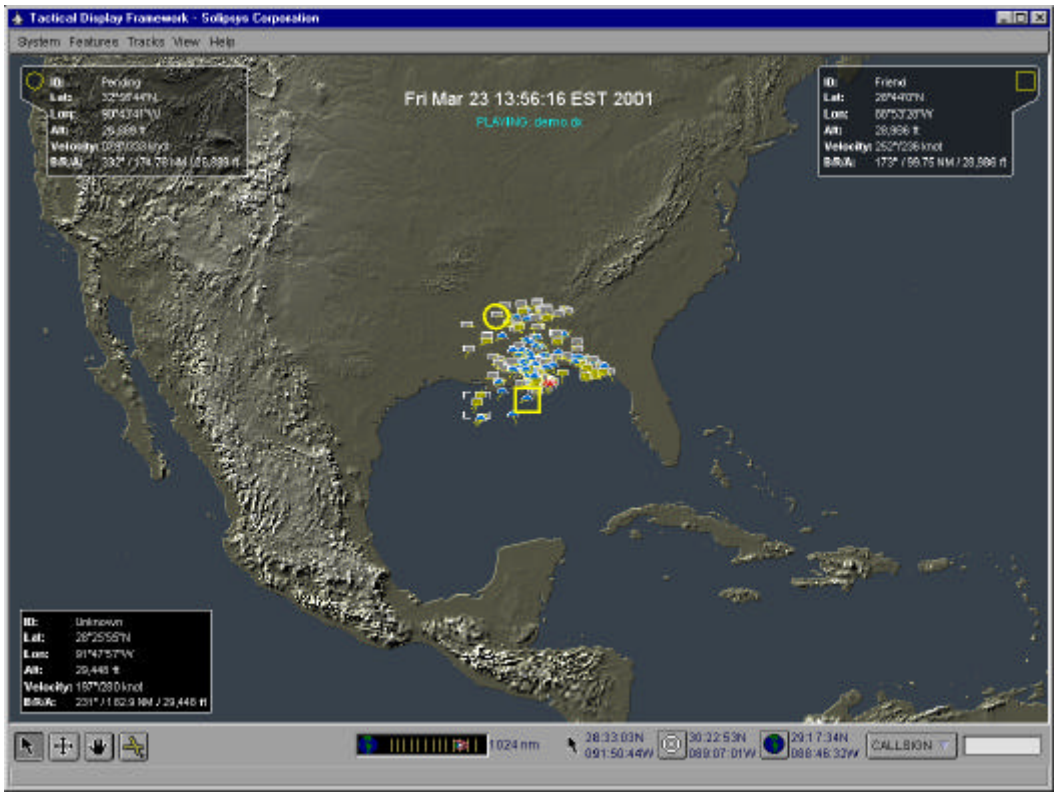

Figure 9. Details Windows

2.6 Action Menus

Action menus are pop-up menus that appear when user right-clicks on the main display. Some options are shortcuts but many toggle different capabilities, such as the Details window, on and off. The content of these pop-up menus will change according to a user's particular configuration and the context in which the pop-up menu appears. There are action menus for many different contexts, such as main display, tracks, markers, pairing lines, and engagement lines. The two main menu contexts are main display and track.

2.6.1 Main Display Menu

The Main Display pop-up menu (Figure 10) substantially increases the capability of TDF. Navigations can be made at this level quickly and efficiently. This menu appears when a user right-clicks on the main display's map.

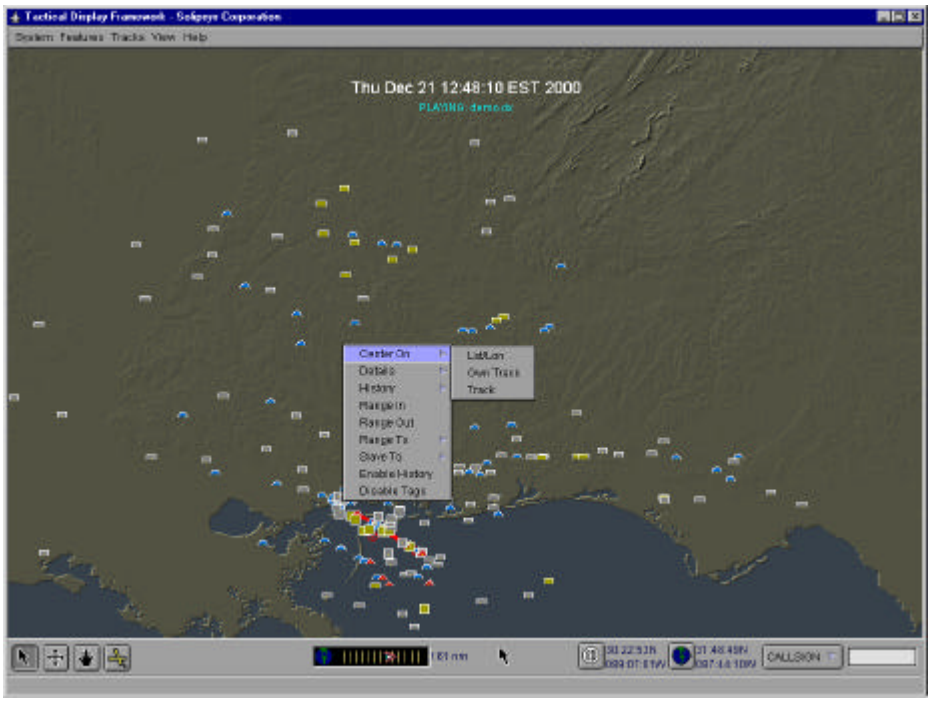

Figure 10. Main Display Menu

The options included in the pop-up menu will vary according to the TDF configuration. Table 5 contains options usually included:

Table 5. Action Menus

Center On	Lat/Lon	Centers on a specific location
	Own Track	Centers on a user's position
	Track	Centers on a variety of track numbers and call signs
Details	Next/Previous Primary	Cycles through primary hooked objects one at a time and displays information known about the most highlighted in the Details window.
	Next/Previous Secondary	Cycles through secondary hooked objects one at a time and displays information known about the most highlighted in the Details window.
	Primary	A Details window appears whenever an object is primary selected.
	Rollover	A Details window appears on rollover.
	Secondary	A Details window appears whenever an object is secondary selected.

	Tag On Selection	Tags appear near track when a track is selected.
	Display Rollover At Object	Details window appears near the object on rollover.
History	On/Off	Turns history on and off globally.
	Selected	Shows history only when an object is selected.
Range In/Range Out	Zooms the chosen display in and out.	
Range To	Zooms to a given distance from the earth	
Slave To	Ownship	Tracks a user's position (ownship) to keep the object in the center of the display.
	Primary	Tracks the actively hooked object to keep the object in the center of the display.
	Secondary	Tracks the actively hooked object to keep the object in the center of the display.
	Course	Tracks the chosen object and keeps the direction of the earth in its course.
	Range	Tracks and Zooms to maintain all selected objects in view, especially useful when more than one object is selected.
Disable History	Globally disables history no matter what other selections have been made.	
Disable Tags	Globally disables tags regardless of other selections.	

2.6.2 Track Menu

The track menu (Table 6) is a pop-up menu that appears when a user right-clicks on a track. It operates the same way as the above menu, but it affects only the track(s) selected. The actions selected from the pop-up menu are context sensitive to the group selections. The following table contains options usually included:

Table 6. Track Menu

Assign ID	Pending	A track not yet subjected to the identification process.
	Unknown	An evaluated track not yet identified although it has been through the identification process.
	Assumed Friend	A Track is assumed friendly because of its Characteristics, Behavior, or Origin
	Friend	A Track belonging to a declared, friendly nation

	Neutral	A track whose Characteristics, Behavior, Origin, or Nationality indicates that it is neither supporting nor opposing friendly forces.
	Suspect	A potentially dangerous track because of its Characteristics, Behavior, Origin, or Nationality
	Hostile	A track eligible for engagement
Call Sign	Enables the editing of the selected object.	
Check In	Time of last check in.	
Set Reference	Establishes the selected object as a reference to the pointer. The selected object's Bearing/Range is displayed near the pointer.	
Slave To	Group	Slaves the display to follow the group of hooked objects to keep all or most of the group onscreen at all times.
	Track Number of Selected Object	Tracks the selected object to keep it in the center of the display.
	Course	Tracks the chosen object and keeps the direction of the earth in its course.
	Range	Tracks and Zooms to maintain all selected objects in view, especially useful when more than one object is selected.
Toggle History	Toggles history on and off	
Toggle Tags	Toggles tags on and off	
Add WEZ	Toggles Weapons Engagement Zone, an overlay that appears in front of a track	
Force Tell	Forces the selected object to be displayed regardless of filters	
High Priority	Designates particular tracks and increases update rate	
Drop Track	Kills track	

2.7 Preset Positions

The Preset Positions application (Figure 11) enables the user to store and retrieve current screen center positions and range scales for later retrieval.

Setting a preset position:

1. Press and release 0 (zero), the default key used to toggle (display/dismiss) the view eye positions window. The view eye positions pop-up window should now be visible.
2. Depress and hold a <number> key (1-9) until the position in the window is filled in. By default, nine positions can be stored by using the keys 1-9.
3. Left-click on the preset positions and drag to move it.

Retrieving a preset position:

Press and release the appropriate number key. The preset screen center position and range scale will be restored in the main display.

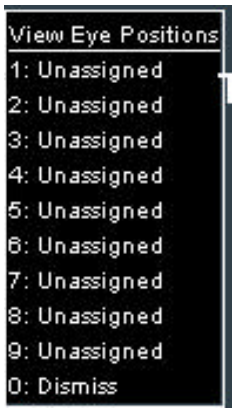

Figure 11. Preset Positions

2.8 Dynamic Coordinates

The Dynamic Coordinates (Figure 12) area provides a continuous readout of the current mouse pointer position whenever the pointer is placed inside the main display. All of these values are output in latitude and longitude. It also includes the current screen center coordinates, the current reference position, and the current ownship position. The following is a list of functions for the dynamic coordinates found in the control bar (from left to right):

- Pointer position shows the location of the pointer.
- The ownship pushbutton quickly centers the main display on ownship.
- The ownship coordinates display position of ownship.
- The locator pushbutton opens the view locator application.
- The locator coordinates display either ownship or the locator's center position.

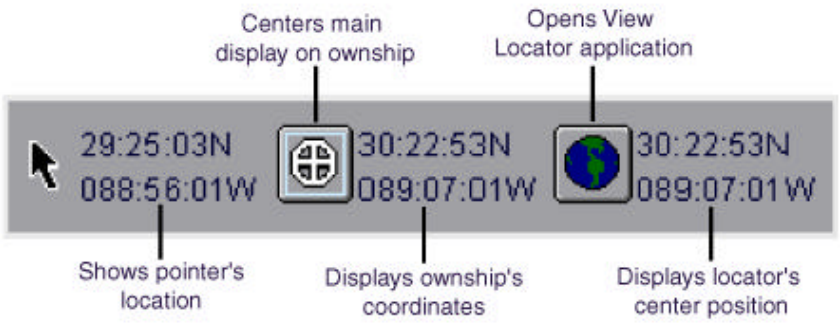

Figure 12. Dynamic Coordinates

There are several coordinate systems to choose from, including: Latitude and Longitude (LL); Local MGRS (Local); Universal Transverse Mercator (UTM); and Military Grid Reference System (MGRS). The Local MGRS is a truncated version of MGRS: it only displays the first two numbers of each number set. Unlike LL, Local, and UTM, the MGRS coordinate system does not have a reference point.

Switching between Pointer coordinate systems:

1. Right-click on the pointer coordinates
2. Choose one of the systems

Changing Ownship or Reference coordinate systems:

1. Right-click on the reference coordinates
2. Choose one of the systems

A user can change the systems through the coordinate system panel in the Preferences application. Selections made in the control bar are independent of Preferences unless default is chosen. The default option refers to choices made in Preferences >> Coordinate Systems.

Using the history option:

1. Right-click on geographic locator's center position coordinates
2. Choose History
3. Select recent location from menu. Any location coordinates in the menu following the one selected will be replaced by new location coordinates. Ten locations will remain in the buffer.

This shortcut enables a user to jump to any preset location on earth. The View Locator Screen (Figure 13) is accessible through the menu bar (Help>>View Locator) and control bar (above).

Using Geographic Location Shortcut:

Double left-click on the location entry or highlight the location and press the 'Go To' button.

Saving a new location:

1. Press 'Add'.
2. Enter name and lat/lon.
3. Use the pointer in tandem with this application to find the lat/lon of any place on earth.

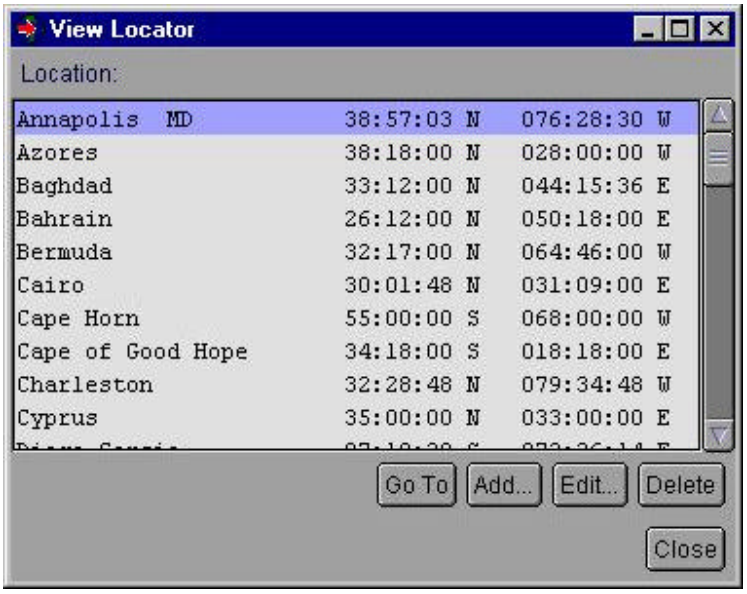

Figure 13. View Locator

2.9 Overlays

The Overlay shapes found in the control bar permit quick overlay implementation. Overlays can be used as boundary zones, doctrine areas, ops areas, and free zones.

Figure 14. Overlay Shapes

Creating a new overlay:

1. Depress Overlay pushbutton in the control bar and a slide menu will appear.
2. Choose a shape in the menu while still depressing the pushbutton.
3. Left-click in the main display to place the overlay.

Changing the size and shape:

1. Left-click inside the shape to turn on edit mode.
2. Drag the outer control points of the overlay to resize or reshape

Moving the overlay:

1. Left-click inside the shape to turn on the edit mode.
2. Left-click on the center control point of the overlay.
3. Drag to the desired position.

When using the control bar to place overlays, a user may also want to take advantage of the overlay pop-up menu by right-clicking inside of overlay. This menu offers many editing options. When greater capability is needed, an operator should use the full Overlays application found in the menu bar (Features >> Overlays) to create, save, and display overlays.

Centering on, renaming, and deleting:

1. Right-click on the overlay
2. Choose one of the above options

Cutting and pasting:

1. Right-click on the overlay
2. Choose Cut (Overlay will disappear from main display but remain in the Overlay application)
3. Right-click elsewhere on the main display
4. Choose Paste (The overlay should appear in the same location it was cut)
5. Move to desired position

Copying and pasting:

1. Right-click on the overlay
2. Choose Copy to replicate the overlay
3. Right-click and choose Paste (Overlay will have the same position as the original. No matter where the user left-clicks on the main display the overlay will always appear from where it was copied.
4. Drag new overlay from on top of original to another location (Use center point to drag or type in a new location to its editor)

Distributing an overlay:

1. Right-click on the overlay
2. Toggle Distribute on (All network participants will receive a copy)
3. Toggle Distribute off (Overlay no longer shared on network)

Flipping and rotating the overlay:

1. Right-click on the overlay

2. Choose the correct and action and direction (**Flip** will reverse the overlay and **Rotate** will move it 90 degrees in one of two directions)

2.10 Track Scenario Play/Record

The Track Recorder (Tracks>>Track Recorder) provides a VCR-like interface to record and playback track scenarios (Solipsys-designed data extracts are also known as '.dx'). The application has an option to playback the recording at .25X to 10X normal speed. Track Playback and Record are independent and can be executed simultaneously (See Figure 15).

In the absence of live data, the playback mechanism may be used to stimulate the display with recorded data. Live data is not displayed while recorded data is being replayed. The replayed data's presentation and the user's ability to interact with it are no different from its live counterpart. However, user requests, such as identity assignment requests, will be ignored while in the playback mode. The record option records the raw data received by the display. Any display filters active during recording will not affect the recording of data.

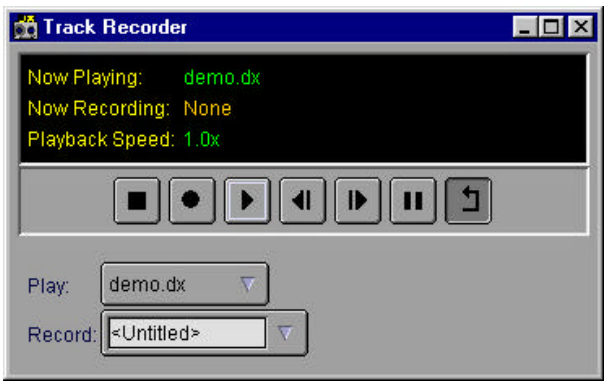

Figure 15. Track Recorder

Stopping, playing, fast-forwarding, rewinding, pausing, or replaying:

Select the appropriate button. The replay option will continuously play the file. Select replay before selecting play.

Recording:

1. Click on the text field near the label, **Record**, and wait for a cursor.
   a. Type in a new filename.
      Or
   b. Select one from the pull-down menu in the same location.
2. Press **Record** to start or stop recording. The record button will have a red light when active.

2.11 Range and Bearing Readouts

TDF uses several methods to determine the bearing and range between any two points or objects on the main display (Figure 16). Range and bearing is displayed by dynamically locking two or more objects (Figure 17).

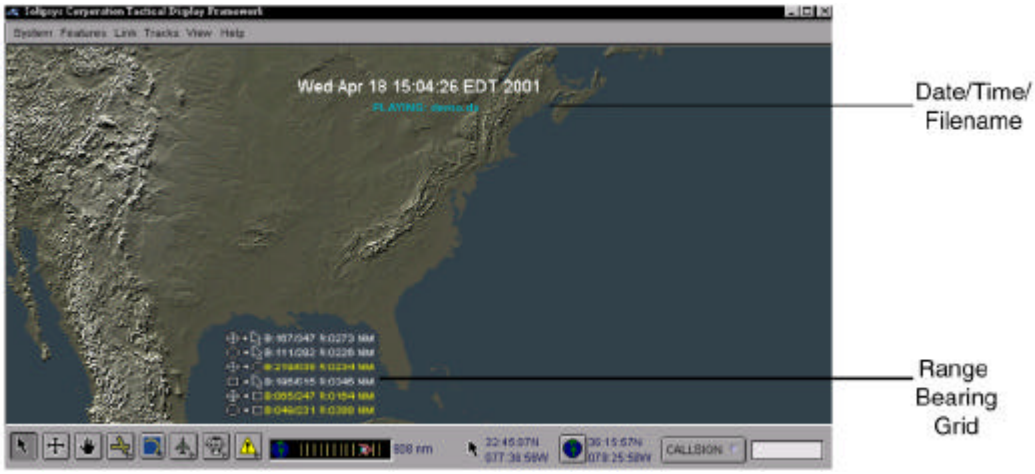

Figure 16. Range and Bearing Grid

Creating Rollover Details windows:
1. Open Tracks >> Details
2. Choose Rollover Tab
3. Left-click on a detail (Altitude, B/R/A from Reference, etc.) in Available Details and press Add.
4. Make sure the Details are toggled on in the All Categories Panel
5. Select OK.

Creating Rollover tags:

1. Open Tracks >> Tags
2. Choose All tab
3. Left-click on one or more details from the Available Details and press Add.
4. Make sure the Details are toggled on in the All Categories Panel
5. Select OK.

Configuring a Pointer tag:

1. Place a bullseye at the appropriate location on the main display.
2. Right-click on bullseye and choose lock position from the pop-up menu.
3. Right-click again and choose Set Reference from the pop-up menu
4. Open Features >> Range Bearing Grid.
5. Left-click and drag Reference To Pointer to the top of the list.

6. Toggle Near Pointer on and Show Bearing Type.
7. Make sure Reference To Pointer is toggled on.
8. Make sure visible is toggled on.
9. Select OK.

Dynamically locking two or more tracks:

1. Primary:
    a. Select one at a time: <Shift> + left-click;
    b. Select several in a region: <Shift> + left-click and drag.
    Or
2. Secondary:
    a. Select one at a time: <Shift> + middle-click (<Shift> + <Alt> + left-click);
    b. Select several in a region: <Shift> + middle-click and drag (<Shift> + <Alt> + left-click + drag).
3. Right-click and choose **Add R/B Line** in the menu.

Figure 17. Dynamic Locking

2.12 Partition Display

When an operator becomes more familiar with the different applications available in TDF, a partition display like the one shown in Figure 18 can be used to keep all necessary applications where a user needs them—on top.

Creating a partition display:

1. Select the size button near the ‘X’ in the upper-right corner.
2. Grab the edges of the main window with the double arrow.
3. Drag to achieve the desired size.
4. Open several applications, such Track Recorder and Magnifier.
5. Grab the edges of the application window with the double arrow.
6. Drag each window to a size that accommodates all the appropriate applications. No application window should overlap another.
7. Ensure that each application still displays the necessary information, because all programs reconfigure their own contents dynamically.

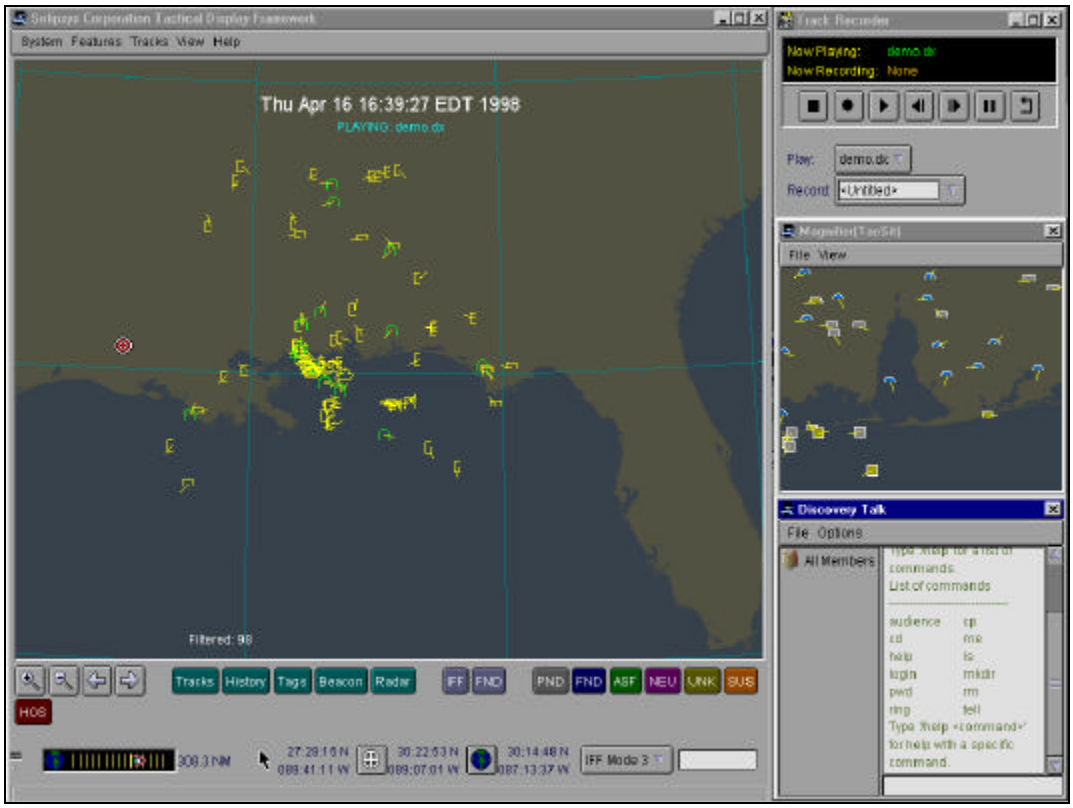

Figure 18. Partition Display

3 TDF IN-DEPTH

TDF In-depth will take the user deeper into its many components and usages. First, it will explore the Control Bar and then the many applications found in the Menu Bar. Depending on the configuration, several appendices-- Appendix A – Filters and Properties; Appendix B – Color Coding; Appendix C – Battlelab; and Appendix D – PAD--are included to explain further capabilities of TDF.

3.1 Control Bar

The Control Bar at the bottom of a TDF display provides quick access to useful commands. In the Upper Control Bar, the toolbar includes Range In/Out, Range History, Action Toggles, IFF/Friendly Toggles, and Identity Toggles. In the Lower Control Bar, there is a toolbar for manually entered display items, a quick range indication and modification tool, "Dynamic Coordinates", and the Hook application. The Control Bar may be toggled on or off by pressing F4 (default) while the cursor is in the main display. The Control Bar will vary according to the user's configuration.

3.1.1 Upper Control Bar

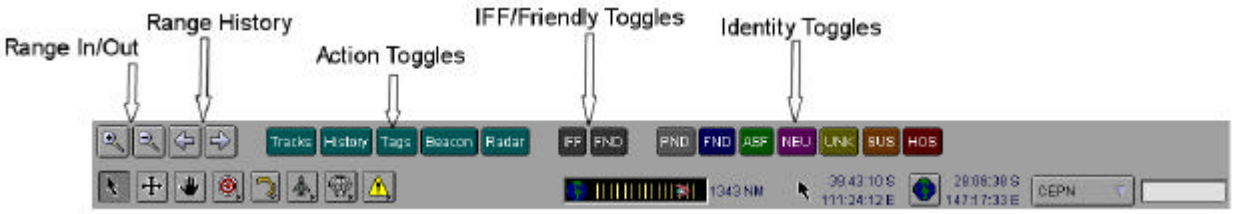

Figure 19. Upper Control Bar

Positions:

- Range In/Out: The magnifying glass (left) with the plus sign ranges in. The magnifying glass (right) with a minus sign ranges out.
- Range History: Range History remembers the exact position of the display for up to 10 positions. The left arrow goes backward in history or up the History list. The right arrow goes forward in history or down the history list. To display history right-click on the Geo Locator's coordinates and select History. The top of the list is least recent; the bottom is most recent.

Action Toggles:

- Tracks: Toggles all tracks on/off, except for Hostile and Force Tell.
- History: Toggles history on/off. When tracks are hooked and this button is toggled, the history will only appear for the hooked tracks. It will persist when deselected until the user presses the History button twice.
- Tags: Toggles tags on/off. When tracks are hooked and this button is toggled, the tags will only appear for the hooked tracks. It will persist when deselected until the user presses the Tags button twice.
- Beacon: Toggles all beacon and reinforced objects on/off.
- Radar: Toggles all radar hits on/off.

IFF/Friendly Toggles:

- IFF: Toggles all tracks with a IFF Mode 1-4 on/off.
- FND: Toggles all Friendly tracks on/off.

Identity Toggles: When tracks are hooked, these buttons can be used to assign identity to the tracks. **Below are the abbreviations and spelled-out identities:**

- PND: Pending
- FND: Friend
- ASF: Assumed Friend
- NEU: Neutral
- UNK: Unknown
- SUS: Suspect
- HOS: Hostile

3.1.2 Lower Control Bar

The Lower Control Bar (Figure 20) at the very bottom of a TDF display provides quick access to useful commands. There is a toolbar for manually entered display items, a quick range indication and modification tool, Dynamic Coordinates, and the Hook application. The Control Bar may be toggled on or off by pressing F4 (default) while the cursor is in the main display. The Control Bar will vary according to the user's configuration.

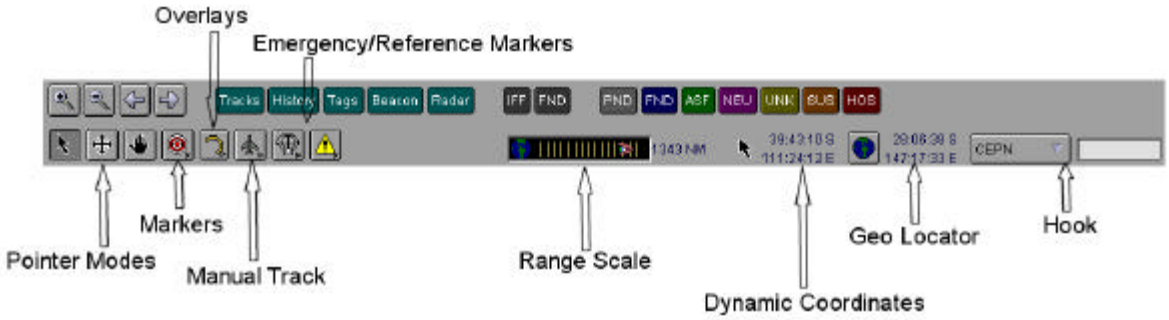

Figure 20. Control Bar

3.1.3 Markers

The **Markers** application (Figure 21) allows the operator to drop symbols at various locations in the main display by selecting a marker located at the lower left of the screen. If the airbase pushbutton is pressed, a menu of more pushbuttons will slide out to its right. The chosen marker can then be manually inserted into the main display and edited. Use the right-click menus to edit the markers. After placement and editing, the markers can be distributed to others on the network.

Figure 21. Markers Application

Adding an arrow marker:

- Left-click and hold the airbase icon. The menu displayed in Figure 21 will appear to its right
- Drag the pointer to the arrow marker releasing only when selection has been made.
- Left-click on the main display where a marker is required.
- Right-click on the marker to **Set Reference**, **Slave To**, **Lock Position**, **Distributed**, **Delete Point**, or **Edit Point**.

Depending on the marker, a variety of options and data entry actions are available, including a distribution option (via the display network) and/or a send option (via data link). For example, the Arrow marker includes an arrow locator mechanism. If the first user distributes an arrow to a second user, the second user can find where the arrow marker is by following the direction of the arrow locator as is shown in Figure 22.

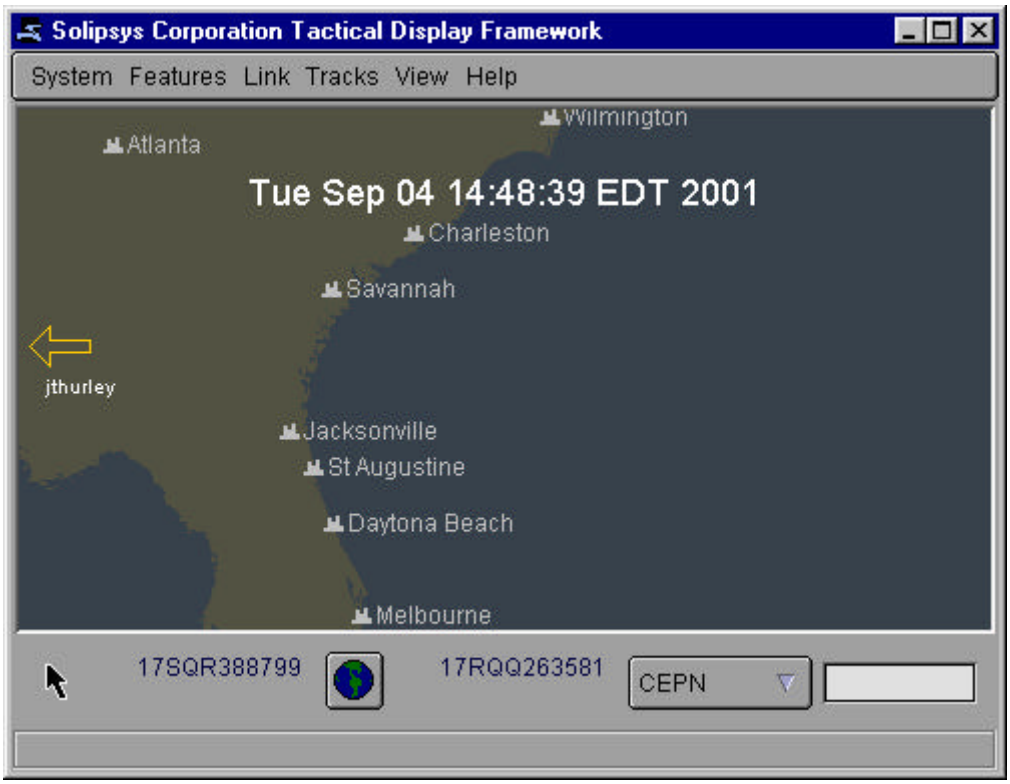

Figure 22. Arrow Locator

3.1.4 Hook

The Hook application shortcut (Figure 23) allows the operator to search the track database for objects containing a variety of conditions, such as DTN, JTN, CU, and IFF Modes 1-4. All objects, which match the search criteria, are hooked in the main display.

Figure 23. Hook Application shortcut

If a track needs to be hooked based on some attribute, the operator should use the hook window. If an object in the main display needs to hook according to its geographic location, the operator should select the object using one of the techniques discussed in Section 2.4. A single asterisk '*' by itself may be used to search for all objects that contain the selected condition.

3.1.5 Keystrokes and Accelerators

Many keyboard shortcuts, accelerators, and a Key Binder have been added to enable efficient interaction with TDF. Table 7 shows the default keyboard shortcuts. Table 8 shows the non-configurable mouse operations available in the main display discussed earlier in this document. Table 9 and Table 10 list the non-configurable panning and dragging mouse operations. Table 11 contains the default accelerator list for standard applications. All of these default selections, except for the mouse operations, can be changed in the Key Binder application (View>>Key Binder) in the menu bar. Since the TDF application list is plug-in defined, this list can vary from system to system.

Table 7. Keyboard Shortcuts

Keyboard Shortcut	Action
F1	Help Viewer
F2	Reset Pointer Control
F4	Toggle Control Bar Display
F5	Toggle Menu bar Display
- or Numpad -	Range out
= or Numpad +	Range In
J or Left Arrow	Move West
L or Right Arrow	Move East
I or Up Arrow	Move North
K or Down Arrow	Move South
.	Toggle Enhanced Hooked Tracks
Shift + J	Rotate Counter-clockwise
Shift + L	Rotate Clockwise
C	Toggle Country Colors

Keyboard Shortcut	Action
E	Toggle Emboss
F	Toggle Filters
G	Toggle Range/Bearing Grid
H	Toggle Track History
R	Set Reference
S	Toggle Stars Display
T	Toggle Range Bearing
0 (zero)	Display Preset Eye Positions
Press 1-9	Jump to Preset Eye Position *n*
Press + Hold 1-9	Set Preset Eye Position

Table 8. Mouse Pointer Operations

Mouse Operation	Action
Left-click	Primary Hook
Middle-click or Alt + left-click	Secondary Hook
Shift + left-click + Drag	Primary Group Hook
Shift + middle-click or Alt + Shift + left-click	Secondary Group Hook
Double left-click + Drag or Ctrl + left-click + Drag	Rubberband Range
Right-click	Pop-up Menu
Double left-click or Ctrl + left-click	Offset
Left-click + Drag	Range/Bearing Indicator

Table 9. Pan Mode Operations

Mouse Operation	Action
Double left-click + Drag or Ctrl + left-click + Drag	Pan
Double middle-click + Drag north or Ctrl + Alt + left-click + Drag north	Recenters On A Point and Zooms In
Double middle-click + Drag south or Ctrl + Alt + left-click + Drag south	Recenters On A Point and Zooms Out

Table 10. Drag Mode Operations

Mouse Operation	Action
Double left-click and Drag or Ctrl + left-click and Drag	Drags While Retaining Center Pointer
Double middle-click and Drag north or	Zooms In

Mouse Operation	Action
Ctrl + Alt + left-click and Drag north	
Double middle-click and Drag south or Ctrl + Alt + left-click and Drag south	Zooms out

Table 11. Application Accelerators

Application Accelerator	Action
Ctrl + F	Preferences
Ctrl + H	History
Ctrl + K	Hook
Ctrl + I	Information
Ctrl + L	Track Lists
Ctrl + M	Geo Options
Ctrl + O	Overlays
Ctrl + P	Print
Ctrl + Q	Quit
Ctrl + R	Reset
Ctrl + T	Presentation
Ctrl + U	Multigraph
Ctrl + V	Video Switch

3.1.5.1 Using Key Binding

Changing the shortcut for the Move North navigation:

1. Open the Key Binder window (Figure 24).
2. Left-click inside the second field in the appropriate row.
3. Press the letter R.

This will change the shortcut from I to R and will delete any other shortcut that shared this letter to eliminate duplications. These shortcuts can be added to any action included in the Key Bindings application; any additions an operator makes will alter the default.

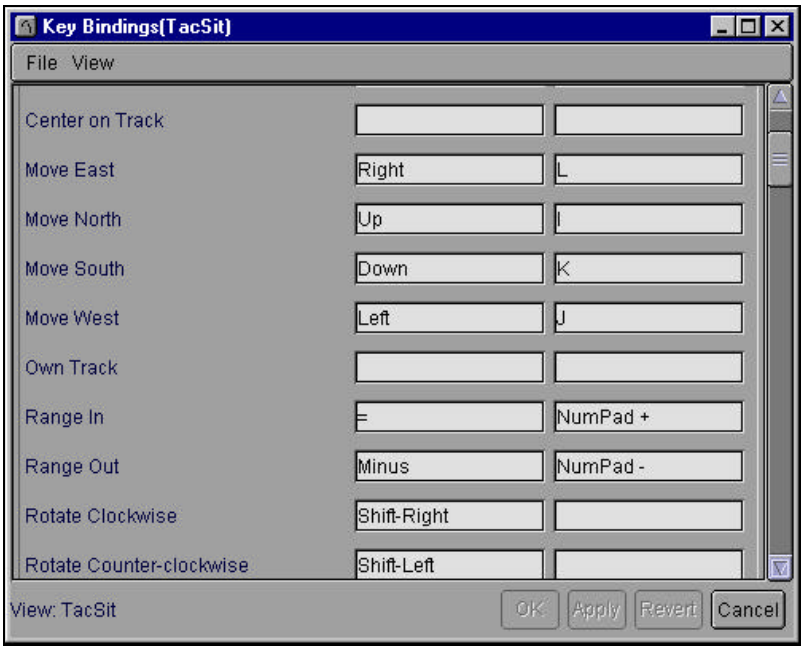

Figure 24. Key Binder

3.2 Range Bearing Grid Readout

The Range Bearing Grid (Figure 25) allows the operator to maintain a convenient grid of ranges and bearings in an on-screen display. If enabled, the grid can show the relative positions of the primary hook, secondary hook, ownship, a reference point, and the pointer. The reference point can be associated with a track or a special point, allowing maximum flexibility.

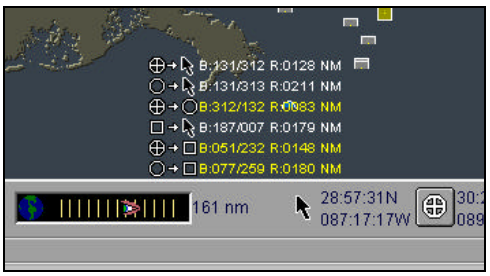

Figure 25. Range Bearing Grid Readout

To display the Range Bearing Grid, either select Image Visible from the editor, or use the G view key. When the pointer is over the main display, up to four additional pointer lines will appear in the grid. Also available in the Editor, a user can set the readout to appear near the pointer, which is useful to determine the range and bearing from a given reference point.

The Pointer is the main navigation tool. As the pointer moves over the display, relevant grid line data is automatically updated, allowing the operator to find the ranges and

bearings to any item on the display.

The Circle is the active hook primary track. The display shows the active hook concept by an especially bold enhancement around the track.

The Square is the active hook secondary track. This secondary icon behaves identically to the primary icon above, except it watches the secondary hook.

The Ownship icon denotes the operator's position. Ownship will only change if the object is mobile.

The Reference Point is a specific track or special point that has been chosen by the operator. The default view key R can be used to assign a primary hook to the reference point. An alternate method to assign the reference point is to use the context menu over the Range Bearing Grid pop-up on the main display. The position of the reference point will follow the track or special point to which it was assigned. A special indicator will appear over the display symbol for the reference point.

The actual Range Bearing Grid display of this information presents all of the combinations, up to nine, of the five position types. In the grid display, the information presented is the Bearing from the first icon to the second icon followed by a slash, and then the reciprocal bearing (from second icon to the first). After the bearings, the range is listed.

Drawing Range and Bearing Lines from one object to another:

1. Select an object.
2. Right-click to select 'lock position' from the resulting menu.
3. Drag the pointer **from** or **to** the locked object to draw a range/bearing line.

4 MENU BAR APPLICATIONS

The following sections describe the applications available from the various pull-down menus located on the menu bar, which the operator can toggle on and off with F5 (default). Most applications within TDF include similar file and view menus and implementation buttons.

4.1 Application Menus and Buttons

4.1.1 File Menu

The File menu usually contains the items in Table 12:

Table 12. File Menu

Command	Action
New	Opens a new window or previously saved file.

Open	Opens a new window or previously saved file and closes ones already open.
Save	Saves the file as the original file name.
Save As	Saves the file with a given filename.
Recent Documents	Lists recent documents as shortcuts.
Close	Closes files and windows of a given plug-in.

4.1.2 View Menu

The View menu allows the user to select the display on which the settings will be applied. Possible options in the default TDF configuration include main display (Tacsit) and Magnifier. If the view is set to Magnifier, all configurations made in such programs as Track Presentation will only affect the Magnifier application and not the main display.

4.1.3 Okay/Apply/Revert/Cancel

In many applications, implementation buttons such as those in Table 13 appear in the lower right of the window.

Table 13. Implementation Buttons

Button	Action
OK	Applies settings and closes window.
Apply	Applies settings but window remains open.
Revert	Resets settings to current state of system.
Cancel	Ignores any changes and closes the applications.

4.2 System

The following applications are all available under the System pull-down menu on the menu bar.

4.2.1 Preferences

The Preferences application (Figure 26) provides operator access to a number of configurable options. Configuration options include animation speed vs. quality, the overall look and feel of the application, range and bearing, coordinate system, network distribution, and pointer control. An additional option is provided to control whether the information application panel comes forward upon selecting objects on the main display.

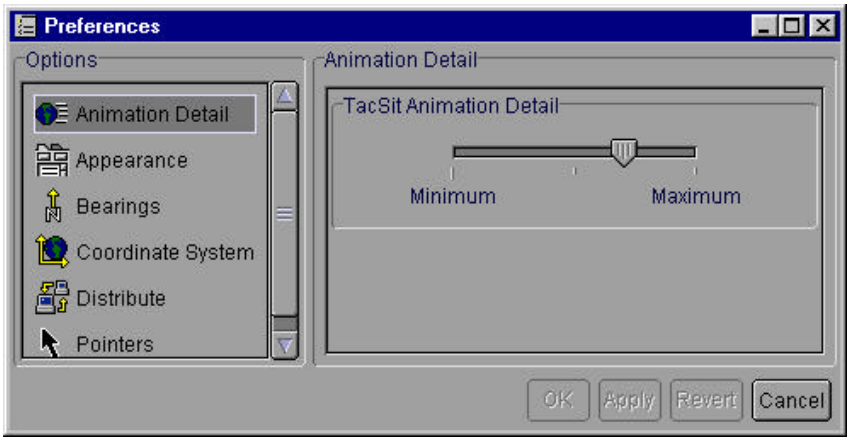

Figure 26. Preferences Application

4.2.1.1 Animation Detail

The Animation Detail (also in Figure 26) adjustment control enables the user to determine how pan and zoom animation modes affect the quality of the display features. When the slider is closer to **Minimum**, more display features will be disabled during the animation, permitting a faster animation. When the slider is closer to **Maximum**, the display features will remain intact, but the animation will be less smoothly rendered.

4.2.1.2 Appearance

The entire look and feel of TDF can be altered via the Appearance panel (Figure 27). There are numerous appearances supported including Metal, Motif, Solipsys Eclipse, Steel (default) and Night. On Windows platforms, the Windows look and feel will also be available.

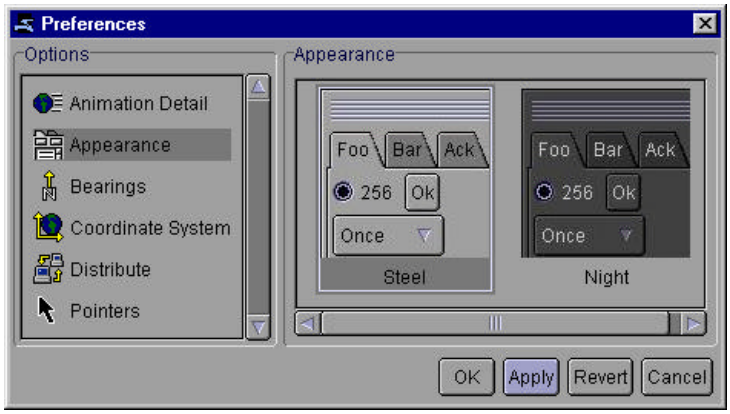

Figure 27. Preferences - Appearance

4.2.1.3 Bearings

The Bearings panel (Figure 28) allows the user to select between True and Magnetic bearing for bearing calculations within TDF. If Magnetic Bearing is selected, the user may enter a declination value (in degrees) to be applied during the bearing calculation processing.

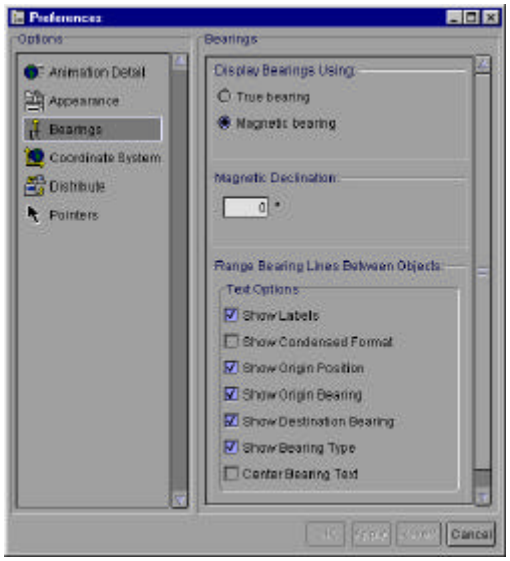

Figure 28. Preferences – Bearings

When lines are formed between on-screen objects, the Range/Bearing Lines options are honored. The check box commands are listed in Table 14.

Table 14. Range Bearing Commands

Command	Action
Show Labels	Toggles (Displays/Suppresses) text ‘BRG:’ and

	‘RNG:’ on the range bearing line.
Show Condensed Format	Toggles line break and abbreviates ‘BRG: RNG:’ to ‘B: R:’
Show Origin	Toggles latitude and longitude of the origin.
Show Origin Bearing	Toggles bearings from the origin to the destination.
Show Destination Bearing	Toggles bearings from the destination to the origin.
Show Bearing Type	Toggles the True vs. Magnetic indicator on the range/bearing line.
Center Bearing Text	Toggles whether the text is centered on the range/bearing line or at the end of the line.

4.2.1.4 Coordinate System

This panel (Figure 29) enables the user to globally change the coordinate system. The available coordinate systems are as follows: Latitude/Longitude (LL), truncated MGRS (Local), Universal Transverse Mercator (UTM), and Military Grid Reference System (MGRS). A reference point can be established in this same panel using the chosen coordinate system.

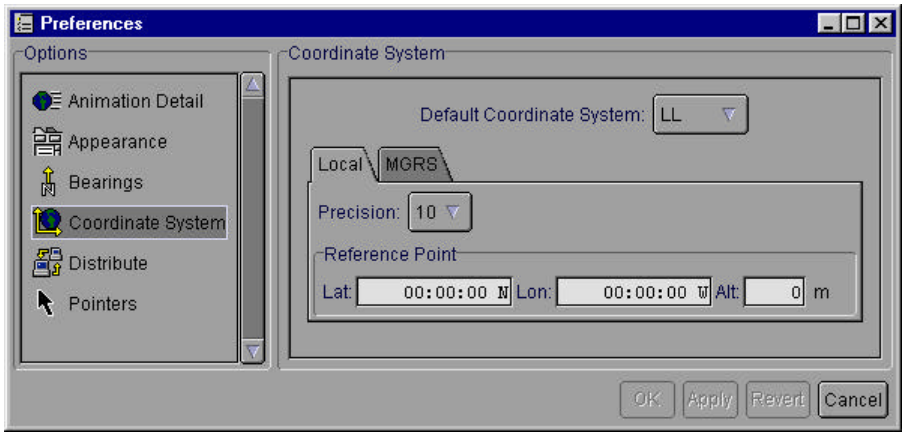

Figure 29. Coordinate System

4.2.1.5 Distribution

TDF supports the distribution of certain objects across the display network when more than one TDF node is online. The Distribution panel (Figure 30) allows the user to register the user’s machine on the network to be able to receive and display Special Points and Overlays from other, connected operators. When another operator selects an object to distribute, all registered operators will receive the Special Points and Overlays at the same point on earth. Some versions also include the options of distributing Video Switch and SOLAR ATO messages to other operators.

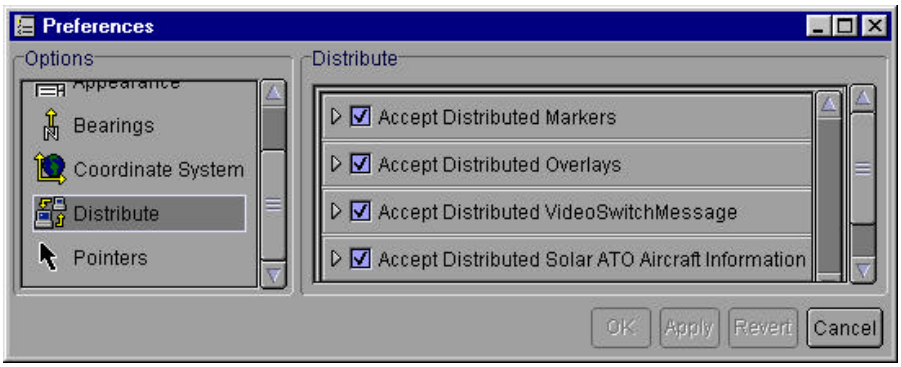

Figure 30. Preferences – Distribution

Distributing a marker:

- Select a marker, such as the bullseye, from the lower-left Markers Control Panel.
- Left-click on the main display, and the bullseye will appear on the map.
- Right-click on the bullseye and select **Distribute** from the action menu; all persons on the network will see this marker at the same location on their display.

4.2.1.6 Pointers

The Pointer Preference panels (Figure 31, Figure 32, and Figure 33) permit the user to customize the various pointer modes available in TDF. The three modes available are Drag, Pan, and Range/Bearing. The Drag Mode panel allows the user to set the zoom speed, allowing customization of the perceived magnification rate when using the pointer.

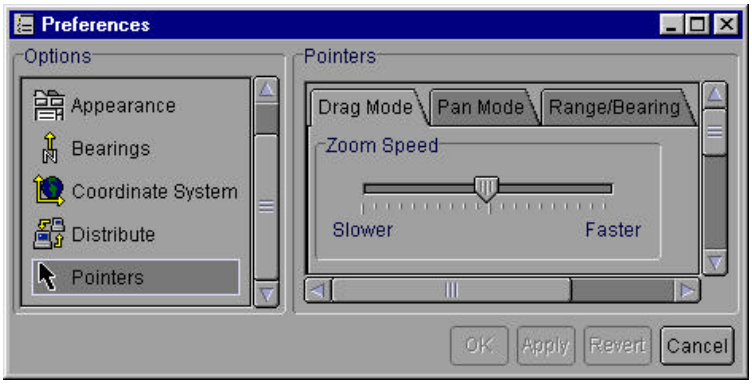

Figure 31. Pointers Panel – Drag Mode

The Pan Mode panel (Figure 32) also has a zoom speed slider, but it has an additional option. The speed can be fixed so the distance the pointer has moved from the selection position is not used to accelerate the zoom animation. A pan speed slider is also provided with a constant speed control to affect the perceived speed in pan animations.

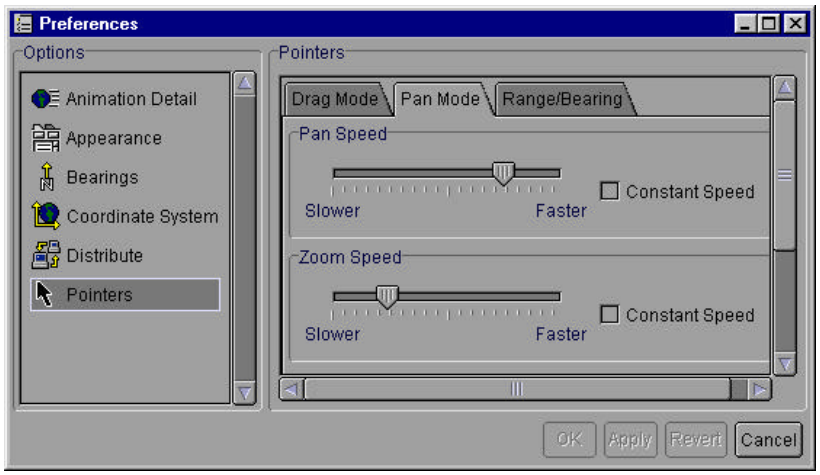

Figure 32. Pointers Panel – Pan Mode

The Range/Bearing Pointer panel shown in Figure 33 contains checkboxes for the display options listed in Table 15. Selecting one or more of these Text Options checkboxes will determine what information is displayed with range and bearing lines. The range and bearing lines appear on the main display when a user left-clicks and drags the pointer. Choosing a Line Option configures the style of these lines.

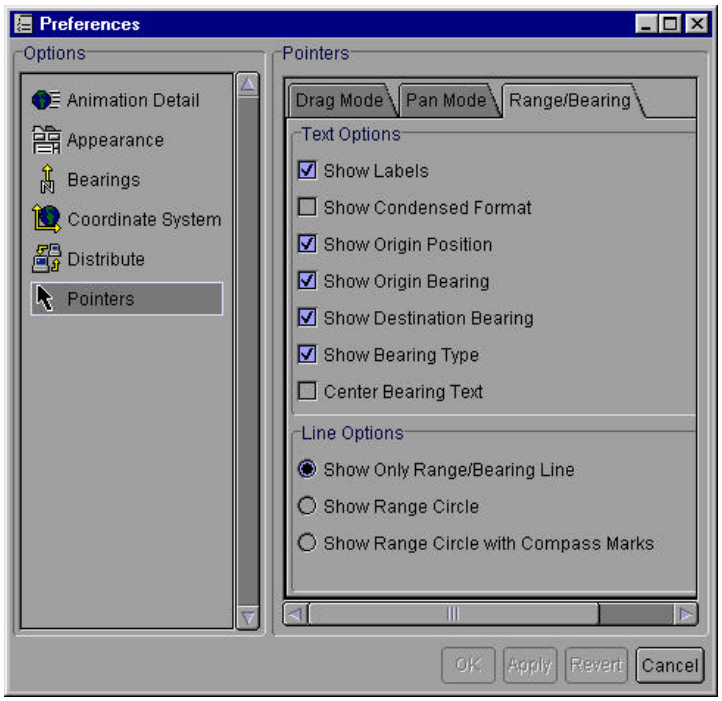

Figure 33. Pointer Panel – Range/Bearing

Table 15. Range Bearing/Line Options

Text Options	Action
Show Labels	Toggles (Displays/Suppresses) text ‘BRG:’ and ‘RNG:’ on the range bearing line.
Show Condensed Format	Toggles line break and abbreviates ‘BRG: RNG:’ to ‘B: R:’
Show Origin	Toggles latitude and longitude of the origin.
Show Origin Bearing	Toggles bearings from the origin to the destination.
Show Destination Bearing	Toggles bearings from the destination to the origin.
Show Bearing Type	Toggles the True vs. Magnetic indicator on the range/bearing line.
Center Bearing Text	Toggles whether the text is centered on the range/bearing line or at the end of the line.
Line Option	Action
Line Only	Displays range and bearing line.
Circle	Displays range and bearing circle.
Circle with Compass Marks	Displays a range and bearing circle with compass marks.

4.2.2 Print

The Print application (Figure 34) allows an operator to print the entire TDF screen contents or selected applications. It requires printer support on the hardware platform executing the TDF application. After it is commanded to print, the computer's local print screen will appear. It will work the same way as other familiar applications.

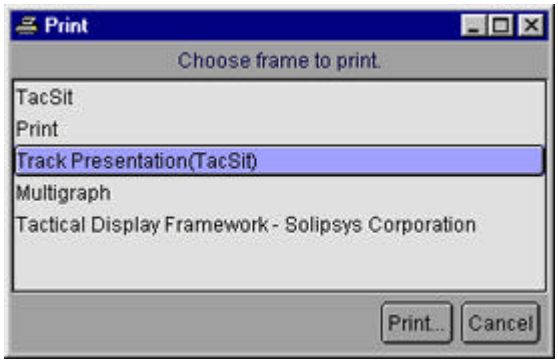

Figure 34. Print Application

4.2.3 Reset

The Reset application (Figure 35) permits the operator to clear the track database, essentially reinitializing TDF and clearing the main display of currently held tracks; to reinitialize all the sensors being displayed in TDF; and to reset available applications to default.

These options are useful when it appears that some track or sensor information may have been corrupted; when other systems connected to TDF have been restarted; or when applications have been incorrectly configured. A dialog box confirms the operator's selection.

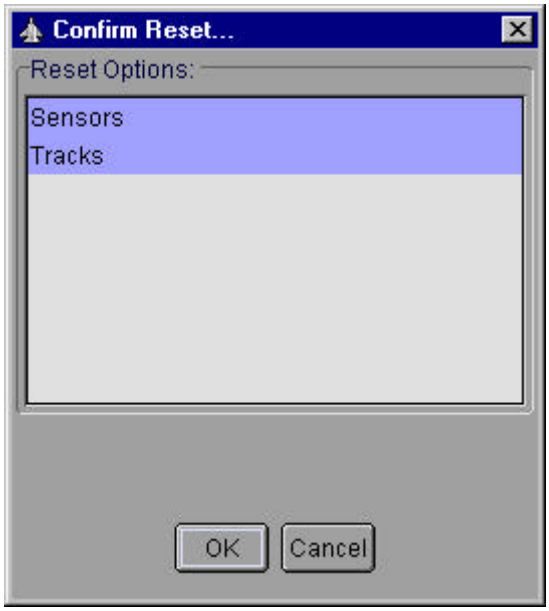

Figure 35. Reset Application

Resetting the sensors:

1. Left-click on **Sensors** (Use Ctrl + left-click to select more than one)
2. Press OK

4.2.4 Status

The Status application (Figure 36) provides performance, discovery users, memory usage, thread status, and track load information associated with the TDF application. The Status application is organized into a five-tabbed panel: Discovery, Java VM, Threads, Track, and View.

The Discovery tab shown in Figure 37 displays all of the other users registered via the TDF discovery mechanism. Discovery is a Jini-like program able to detect when other users log on and off the same network.

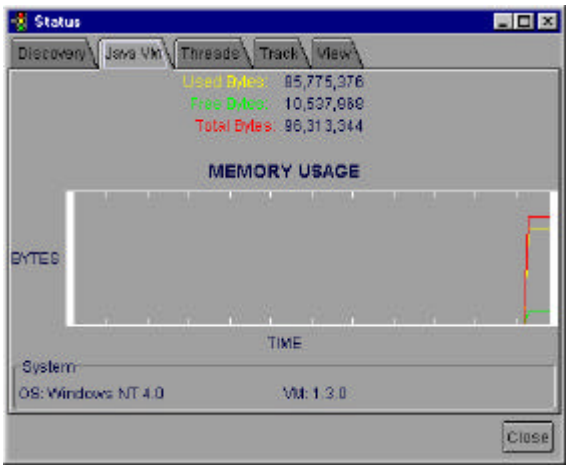

Figure 36. Status - System Memory Usage

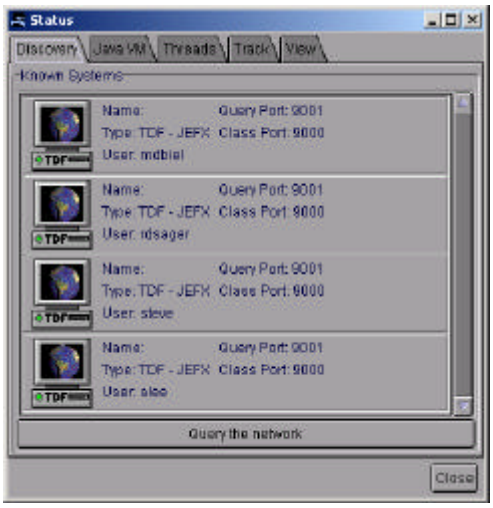

Figure 37. Status Current Users on the System

The Java VM tab provides a real-time graph of used and free memory associated with the Java Virtual Machine. The Virtual Machine can be used to determine TDF's performance. The larger the number of free bytes, the greater the computer's ability to perform its tasks.

The Threads tab displays all of the threads currently executing and the group and priority of each thread.

The Track tab displays information related to the total number of tracks in the system. It also provides a graph of the track counts over time.

The View tab gives other performance details, such as the last redraw and the layer on which it is drawn. The last redraw value corresponds to the number of milliseconds it took to draw the most recent update to the screen. The lowest layer value is usually much larger and refers to the draw time for the entire screen, including any geographic imagery. These numbers are good indicators of TDF's overall performance. In order to improve performance, the operator could display fewer imagery and map options, use a faster animation speed, or disable the no-flicker option on the range/bearing grid.

4.2.5 Quit

The Quit application (Figure 38) allows the operator to shutdown the TDF application. It is equivalent to selecting the Close button on the main TDF window. It closes all windows associated with TDF. A dialog is presented to confirm the operator's selection. Select **Yes** to quit, **No** to cancel.

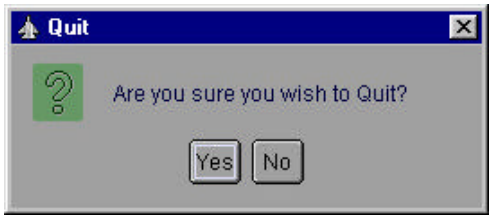

Figure 38. Quit Application

4.3 Features

The following applications are all available under the Features pull-down menu on the menu bar.

4.3.1 Alerts

The Alert Display (Figure 39) permits the user to manage incoming alerts. Alerts occur internally, generated within the TDF application, and externally, originating within an external system. Simple alerts can occur when an overlay is defined as a boundary. Alerts will originate internally when an object has entered or exited a defined region at certain user-specified thresholds. Alerts can be of various types, and are defined by a plug-in system.

When the user opens the application with an active overlay, the list of alerts will appear. The list of alerts is presented in chronological order. Each alert provides detailed information, including the category, date and time of receipt, and a description of the alert. Upon selecting an alert in the list, the complete alert is displayed in the text panel. After reviewing an alert, the operator can acknowledge the alert. In addition, the user may choose to acknowledge all alerts currently in the alert list, which removes them from the list. More complex alerts may not allow acknowledgment, and require operator interaction. These alerts will not appear in the same list as informative alerts.

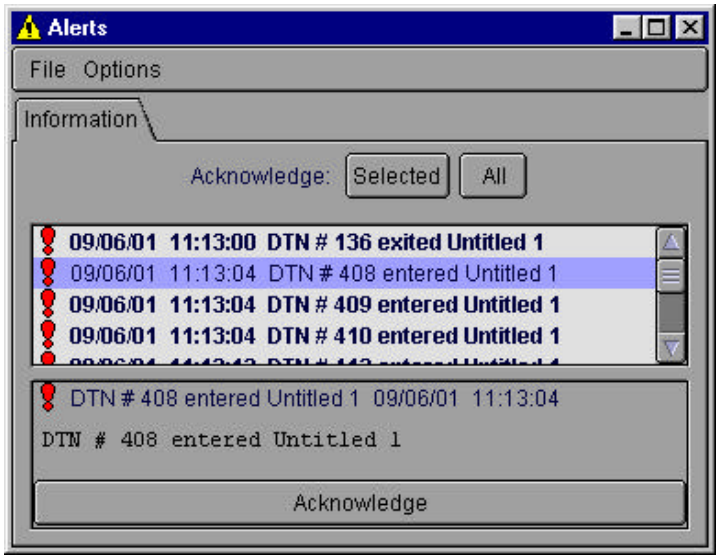

Figure 39. Alert Application

Alerts can be filtered by a category, such as **Warning**, **Caution**, or **Advisory**, thus causing the alert application to not display certain alerts. The Alert Display allows the configuring, enabling, or disabling of audible alerts. **Audible Alerts** enables the operator to configure the type and volume of the sounds (wav) when one of the alert states occurs.

The new logging function records alerts using techniques found in many UNIX applications. Writing alerts to file allows later investigations into the alerts record. If a track violates a user-specified boundary, a track alert will be created and then saved into the log file for later review.

4.3.2 Details Editor

The Details Editor (Figure 40) controls both the information displayed in the corners of the display called details and the information displayed near a track called tags. Details are informative windows that appear in the upper left and right depending on the type of hook, primary and secondary, respectively. Tags, on the other hand, are windows displayed within the immediate vicinity of a track or marker.

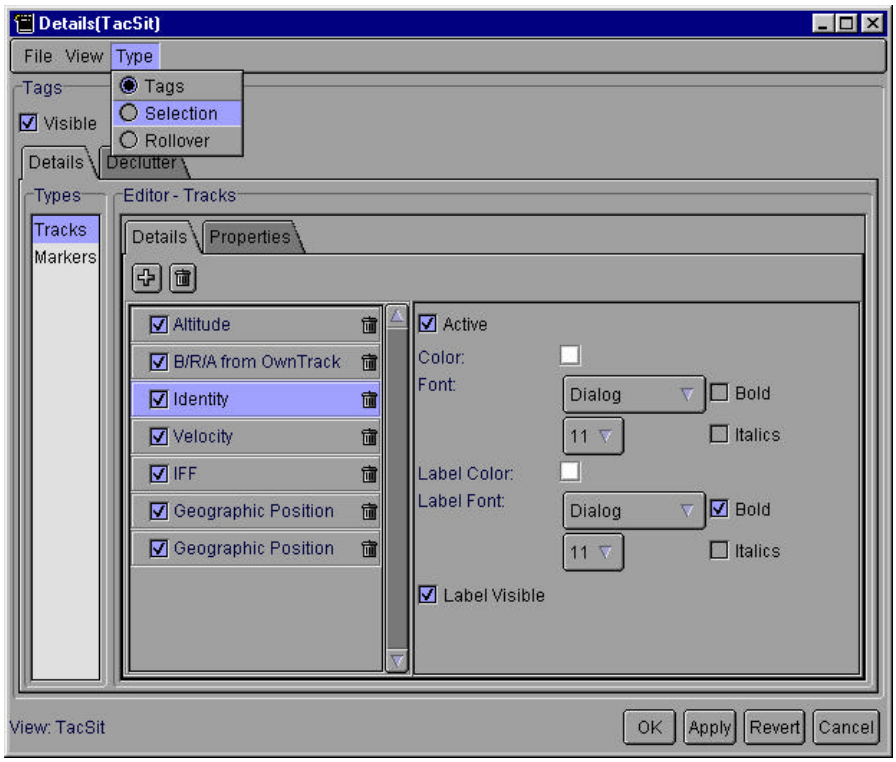

Figure 40. Details Editor

The file and view menus are similar to other applications in TDF. These are discussed in the system menu section (See **Application Menus and Buttons**). The last menu, Type, does operate uniquely. The menu enables the operator to select whether to configure tags, selection, or rollover. Selecting tags will only affect the tag windows on the main display. Choosing selection or rollover makes panels available to configure details windows. Selection is just another term for most hooked. On the main display, the selected track or marker is prominently highlighted in yellow. Rollover details windows appear in the main display when the user moves the mouse pointer over a track or marker without left or right-clicking.

4.3.2.1 Details

In Tags, Selection, and Rollover, there will be two basic panels: Details and Properties. The Details panel includes a list of available details and a list of chosen details. Available Details is a details tree used to configure the information displayed in the details windows on the main display. Each detail contains one piece of information about a track, such as identity or category. Some details are available in logical groups. For example, details useful in Over the Horizon (OTH) operations are grouped in the OTH folder. The UTM, Local MGRS, and MGRS details can be added in addition to or instead of geographic position, latitude longitude.

Adding details to a specific category:

1. Left-click the plus (+) symbol to add a detail
2. Select a detail in the Available Details list.
3. Press the Add button in the category section. If **Unique per Category** is selected, then choose the Add button according to the different categories.
4. Left-click Close

Adding groups of details:

1. Select a folder of details.
2. Press Add.

Or

1. Hold <Shift> + left-click on more than one detail to get all consecutive details.
2. Press Add.

Or

1. Hold <Ctrl> + left-click to choose details singularly.
2. Press Add.
3. Press Close

After details have been selected from the list, the chosen details may be rearranged to suit the user's needs.

Rearranging details:

1. Click the left mouse button and hold on a detail.
2. Drag the detail up or down in the list.
3. Release the left mouse button.

Removing a detail:

Select the trashcan icon located on the right side of the detail.

A detail's characteristics can be changed in the panel directly to the right of the chosen detail list. In this panel, style changes, such as font type, color, and size, can be changed. Additionally, the units of measures and their color can also be changed by using the pull-down menus.

Configuring a detail:

1. Select a detail from the chosen list
2. Configure adjacent panel

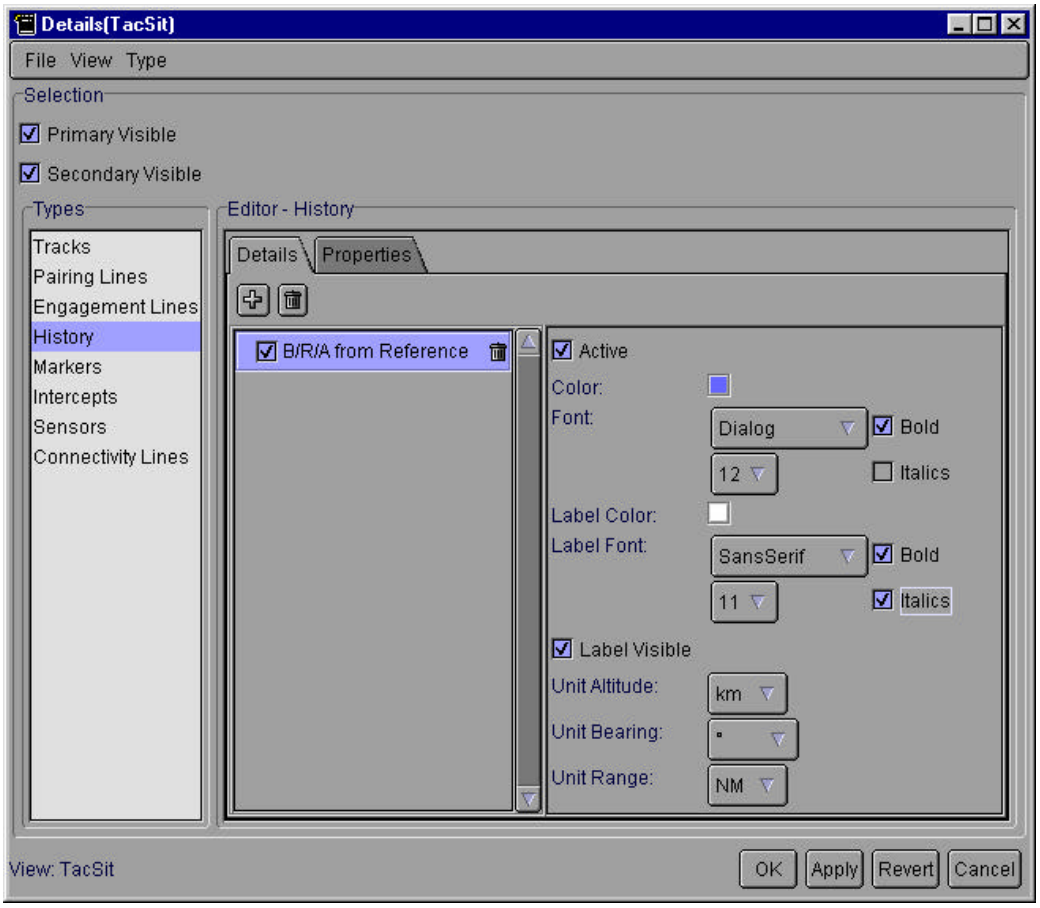

Table 16. Detail Characteristics

4.3.2.2 Properties

The Properties tab gives the user the ability to configure the appearance of the tags and details windows. The window outline color, width, pattern, and fill can be configured. Although the properties panel persists throughout the Details Editor application, the panel only affects the specific type of window. Table 17 describes common options.

Table 17. Properties

Properties	Action
Active	Toggles detail on/off.
Color	Changes the readout's color with either a color swatch or a RGB slider.
Font	Changes the readout's size and style.
Label Color	Changes the color of the readout's label through either a color swatch or a RGB slider.
Label Font	Changes size and style readout's label.

Label Visible	Toggles label on/off.

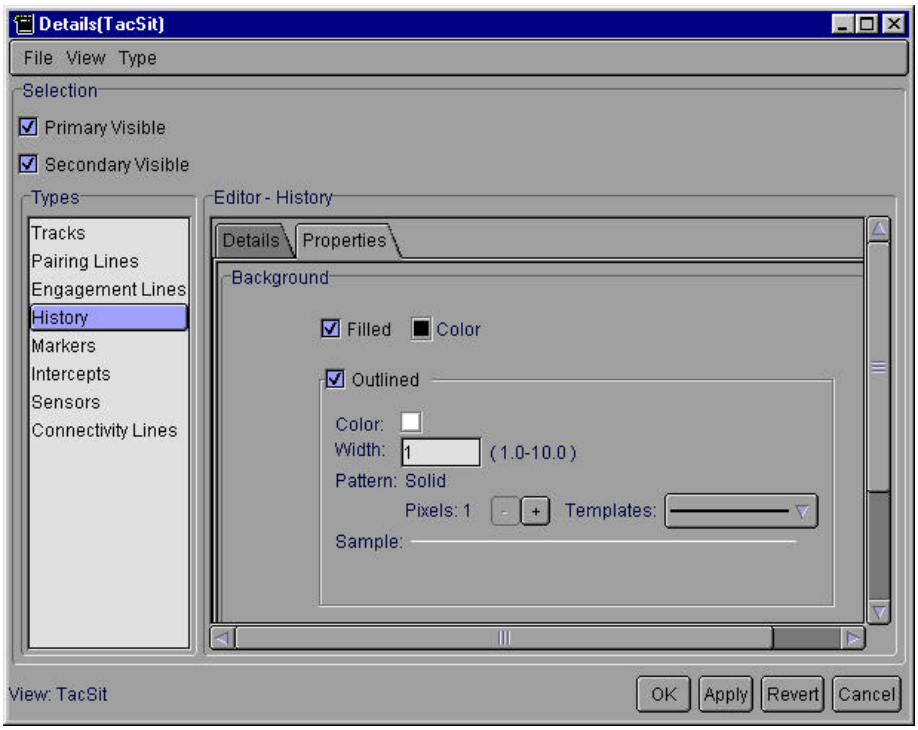

Figure 41. Properties Tab

4.3.2.2.1 Tags

After a selection is made from the Type menu, choose either Tracks or Markers from the Type list far to the left. Selecting tracks will only configure tags or details for tracks. Likewise, selecting markers will only configure tags and details for markers. Then right-click on the track to list the user's implementation choices. The right-click menu for Tracks contains the options described in Table 18.

Table 18. Tracks Menu

Menu Option	**Action**
Category Bindings	Applies configuration to specific categories: Air, Land, Surface, Subsurface, Reference Point, Emergency Point, EW, Space, and Unknown. For example, B/R/A from OwnTrack can be applied to Air tracks while geographic position can be applied to Land tracks.
Group	Creates a user-specified group name and group characteristics. A group can be Category Bindings, Identity Bindings, and Simple. Several groups can be created and then cycled through using the Tags button on the Upper Control Bar.

Identity Bindings	Applies configuration to specific identities. For example, B/R/A from Own Track.
Simple	Applies chosen details and their properties to all tracks.

Creating a set of tag groups:

1. Choose Tags from the Type menu at the top
2. Right-click on Tracks from the Types list
3. Choose Group from pop-up menu
4. Left-click on the plus symbol at the bottom
5. Type a name in the text field: State A
6. Press OK
7. Right-click on State A
8. Choose Identity Bindings from pop-up menu
9. Select Hostile tag to the right
10. Left-click on plus sign
11. Double left-click on Identity, Velocity, and Sensor
12. Press Close
13. Left-click on Identity and change the font color to blue
14. Right-click on State B
15. Choose Category
16. Select Friend tab
17. Left-click on plus sign
18. Double left-click on Identity and Geodetic Position
19. Press Close
20. Right-click on State C
21. Choose Simple from the pop-up menu (This will be the equivalent of OFF)
22. Press Add
23. Select OK
24. Left-click three times on the Tags button in the upper control bar. The tags will cycle:
    a. State A: Hostiles
    b. State B: Friendly air tracks
    c. State C: No tags

The following table describes the right-click menu options for Markers.

Table 19. Markers Options

Menu Option	Action
Group	Creates a user-specified group name and group characteristics. A group can be Category Bindings, Identity Bindings, and Simple. Several groups can be created and then cycled through using the Tags button on the Upper Control Bar.
Simple	Applies chosen details and their properties to all tracks.

Creating marker tags:

1. Place markers on main display
2. Open Marker List
3. Left-click inside each symbols name field
4. Type a name for each marker
5. Close Marker List
6. Open Details Editor
7. Choose Tags from Type menu at top
8. Choose Markers from Type list on left
9. Right-click on Markers Type
10. Choose Simple from pop-up menu if not already selected
11. Left-click on plus sign
12. Double left-click on Marker Name and Geographic Position
13. Press Close
14. Select OK

4.3.2.2.1.1 Declutter

The Declutter Tags (Figure 42) function adjusts all window locations to make them easier to read. There is a variety of options discussed in Table 20.

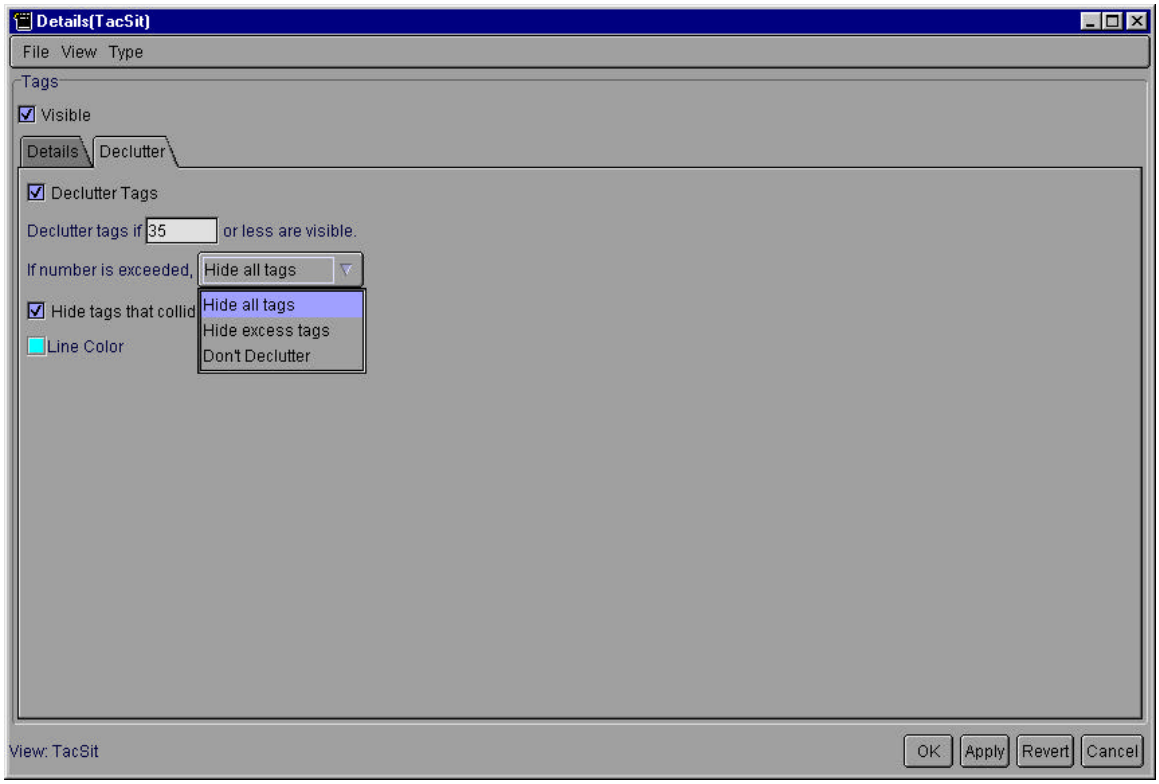

Figure 42. Details- Declutter

Table 20. Decluttering Options

Option	**Action**	
Declutter Tags	Toggles the decluttering function On and OFF.	
Declutter tags if (n) or less are visible	Will perform decluttering on all tracks once the number of tracks on screen exceeds the number inserted into the text field.	
If number is exceeded,	Hide all tags	Turns all tags OFF
	Hide excess tags	Only shows tags that can be displayed without overlap
	Don’t Declutter	Turns Decluttering OFF
Hide tags that collide	Toggles OFF all tags that overlap.	
Line Color	Configures the color of the line drawn between the track and its detail.	

Figure 43 and Figure 44 show the effect of the decluttering function. Figure 3 shows tags without decluttering. Figure 4 illustrates the effects of decluttering. The available tags are now readable. Even then, it is best to apply one of the following three methods to declutter tracks.

- Configure details Selection or Rollover instead of tags
- Include less information in the windows
- Zoom in closer to the earth to reduce the number of tracks on screen in tandem with lowering the number of tracks before the application reaches its threshold (refer second option in above table)
- Group tags for use with cycling (a method explained in .

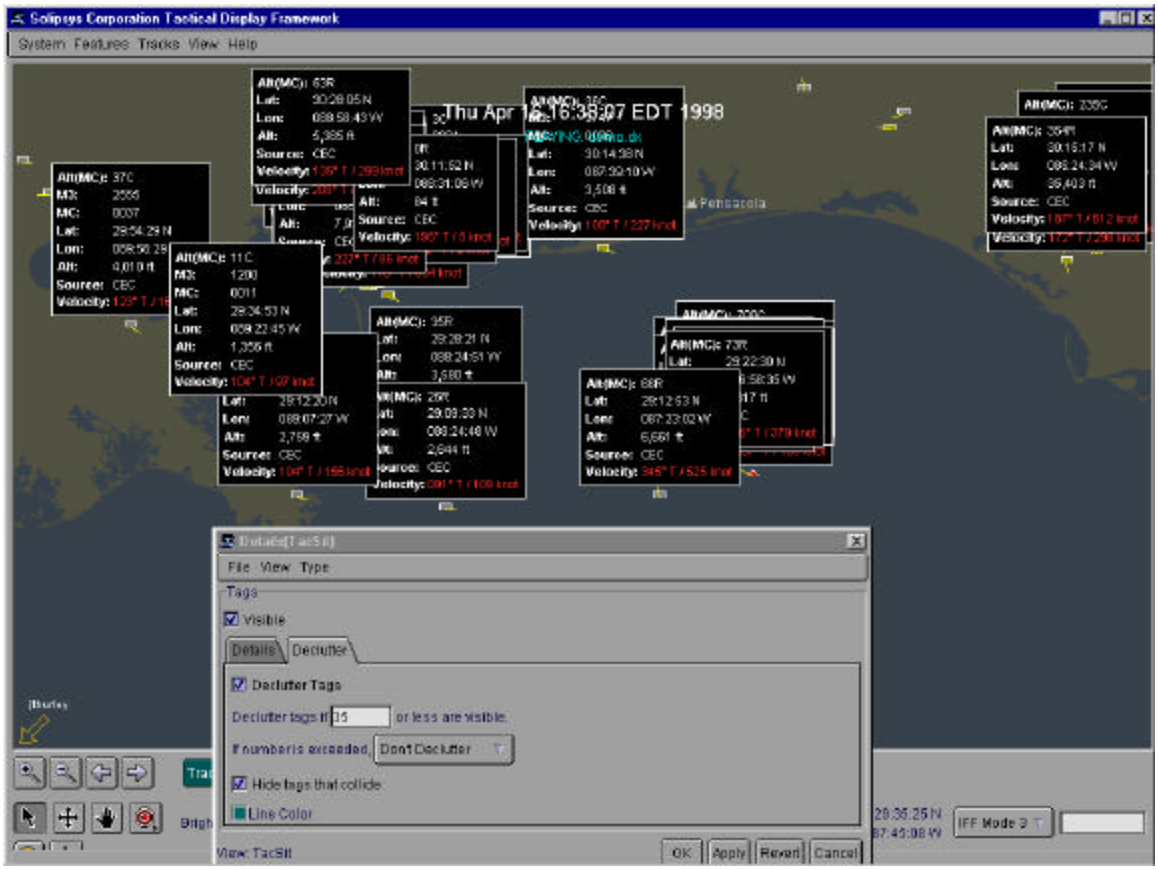

Figure 43. Without Decluttering

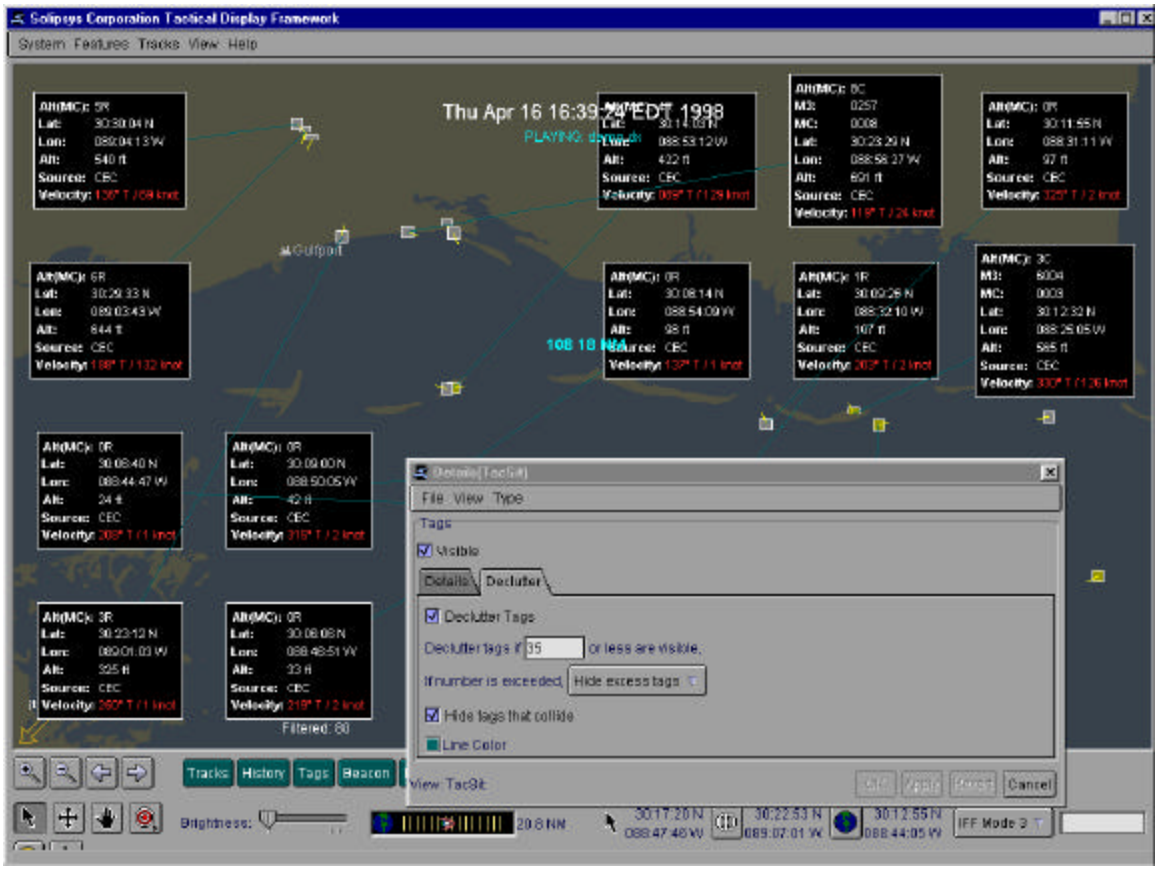

Figure 44. With Decluttering

4.3.2.2.2 Selection and Rollover

Selection occurs when a track is hooked (See Hooking). Rollover occurs when a user place the mouse pointer over a track or marker. Selection and Rollover have nearly the same configuration options. The only difference between the two configuration processes is a location menu in Rollover. This pull-down menu near the top of the application determines the position of the window in relation to the track or marker. The first two check boxes (Primary Visible and Secondary Visible) available toggle primary and secondary hooks off and on.

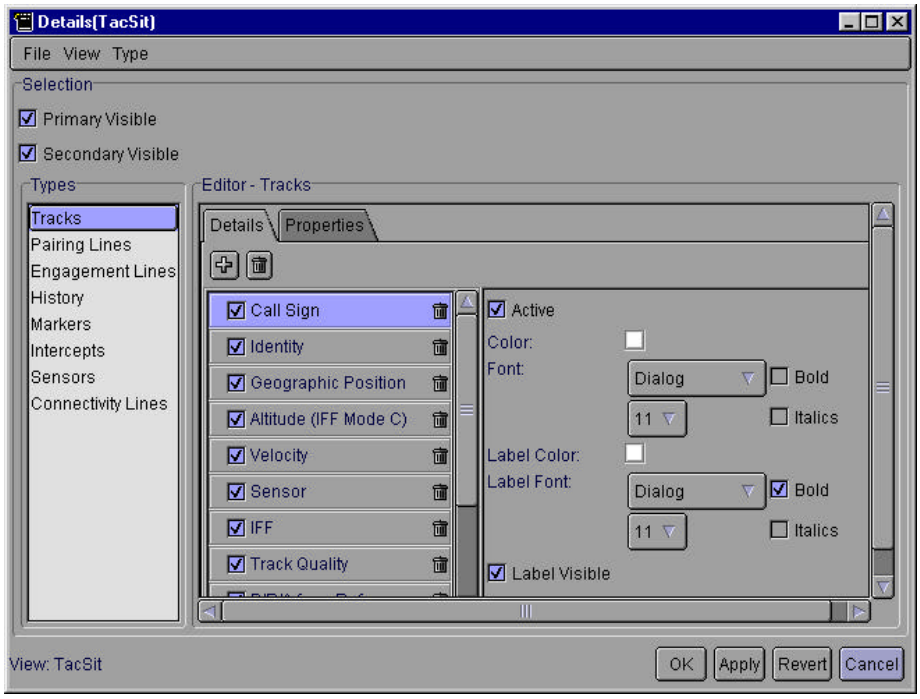

Figure 45. Selection Configuration

Tracks, Pairing Lines, Engagement Lines, History, Markers, Intercepts, Sensors, and Connectivity Lines are all optional types for Selection and Rollover. If Selected is chosen from the Type menu at the top and Tracks is chosen from the Types List on the left, the details windows that will appear when a track is selected will

Configuring Tracks on Rollover (Error! Reference source not found.**):**

1. Choose Selection from the Type menu at the top
2. Choose Tracks from the Types list
3. Left-click on the plus symbol
4. Left-click on Cross Tell
5. Press Add
6. Press Close
7. Highlight Specific Type
8. Press the trashcan to the left
9. Choose font size 12 from the pull-down menu
10. Left-click the checkbox for bold
11. Change the Unit Altitude to meters
12. Select Apply

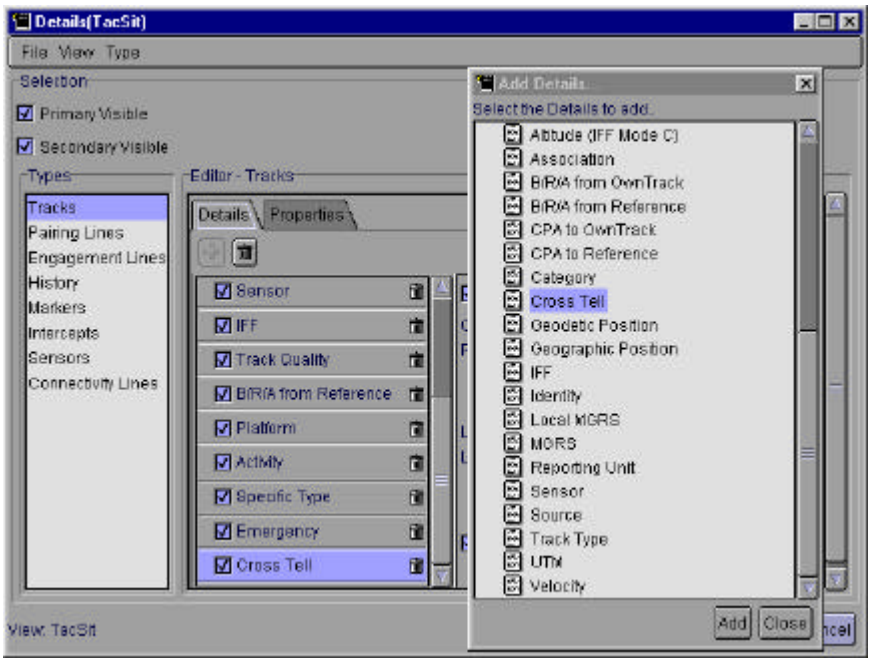

Figure 46. Tracks Configuration

4.3.3 Talk

The Talk application (Figure 47) is a chat-messaging program used in coordination with a TDF Discovery-actuated network, a Jini-like network user locator. It provides a chat capability to add to other network distributions, such as markers and status display functionality. When Talk is launched by a user, the application automatically finds and logs in any other user on the network. It contains a logging function, so no vital messages are lost for either security or reference.

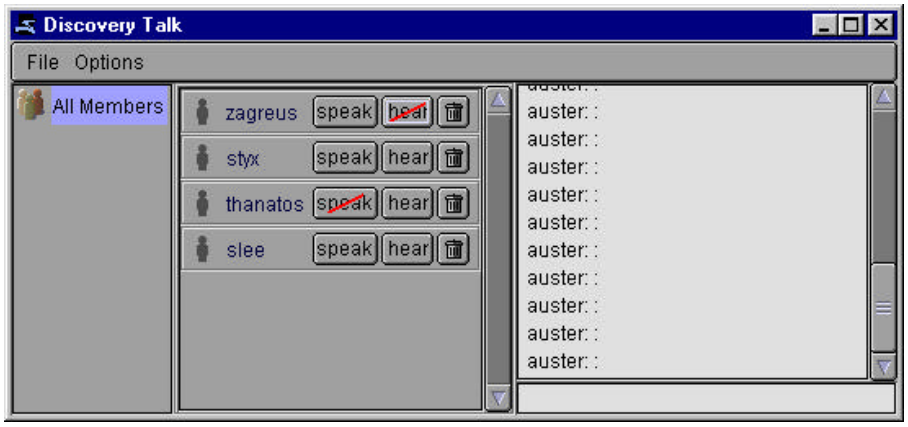

Figure 47. Talk Application

The Log creates a complete record of all exchanges on the network. All messages are time stamped, which adds the time of the receipt of every entry. When activated, the Auto Log function found in the Options menu begins logging activity when the program is launched and continues until disabled or program closure. The first time **File>>** New Log is used, a filename of the user's choice has to be entered as a default. **Options >> Appending Log** is a function used to add logged information to the end of an already existing log file. This could potentially create a log of an entire day or week's messaging.

The transcript function, on the other hand, creates a file by concatenating only the messages present in the dialogue box. Transcripts will not contain messages from participants that a user has chosen to ignore.

The tree is the hierarchy of groups and participants that can be created, modified, and saved. A user can navigate using a combination of clicking your mouse buttons and typing or by typing only. By selecting a directory in the far tree structure will select that directory. Double left-clicking opens and closes the directories beneath. **Groups**--otherwise known as a directory--is a set of members represented by a three-person icon. Members are single users represented by a single-person icon. These icons will be highlighted when active and dull when not available. When using UNIX commands, a '/' character must precede the command.

Creating and removing a tree with groups and members:

Enter the following commands into the entry field under the dialogue box.

1. "/cd" - change directory to home
2. "/pwd" - verify the directory
3. "/mkdir NewDirectory"- creates a directory called NewDirectory
4. "/cp zagreus NewDirectory" (/cp <UserName> <DirectoryName>)- puts a copy of the member, zagreus, into the directory (or group), NewDirectory.
5. Choose File >> Save Tree As.
6. Select the trash icon by NewDirectory to delete it.

Chatting with a member named Zagreus:

1. “/emote smiles” - <OwnName> smiles
2. “Are you there Zagreus?” - Sends a message to everyone highlighting Zagreus

Navigating a tree using basic UNIX commands:

- /cd: change directory
- /pwd: print working directory
- /emote: portray oneself
- /ls: list contents of directory
- /mkdir: make directory
- /rm: remove file or directory
- /ring: causes a system beep on the specified users system. See also “/tell” as they are very similar in function.
- /login: reinitiates the login sequence, as if the user has just launched the application
- /cp: copy a file or multiple files
- /tell: overrides the home group location and the deafness setting to send a message to someone not in your current working group. “/tell everyone” sends a message to all members logged in.
- /help: list of these commands and specific help with a command type: “/help tell”

4.3.4 Doctrine

The Doctrine application (Figure 48) adds incredible capability to TDF. Configuration, alerts (local and global), actions, and target selection are all possible without human interaction. An operator has to create a doctrine or access a doctrine already available; doctrines can be very specific or they can be broad in nature. The following instruction will help in understanding how to take advantage of this application.

Keep in mind:

- Left-click arrow next to conditions and actions to configure them.
- The addition of conditions and configuring of Pass/Fail actions must be complete for the application to function.
- The application follows this logical path: if this condition is true, then perform the actions listed under the Pass tab. If it is not, then perform the actions listed under the fail tab
- New Track Doctrine: Only reacts to new tracks entering the database that satisfy the condition. It will follow the conditions specified and the pass/fail arguments only when it first enters the database. On track update, track that recently entered the database will not cause it to react.
- Track Doctrine: As long as the conditions are met, this doctrine will continue to react.

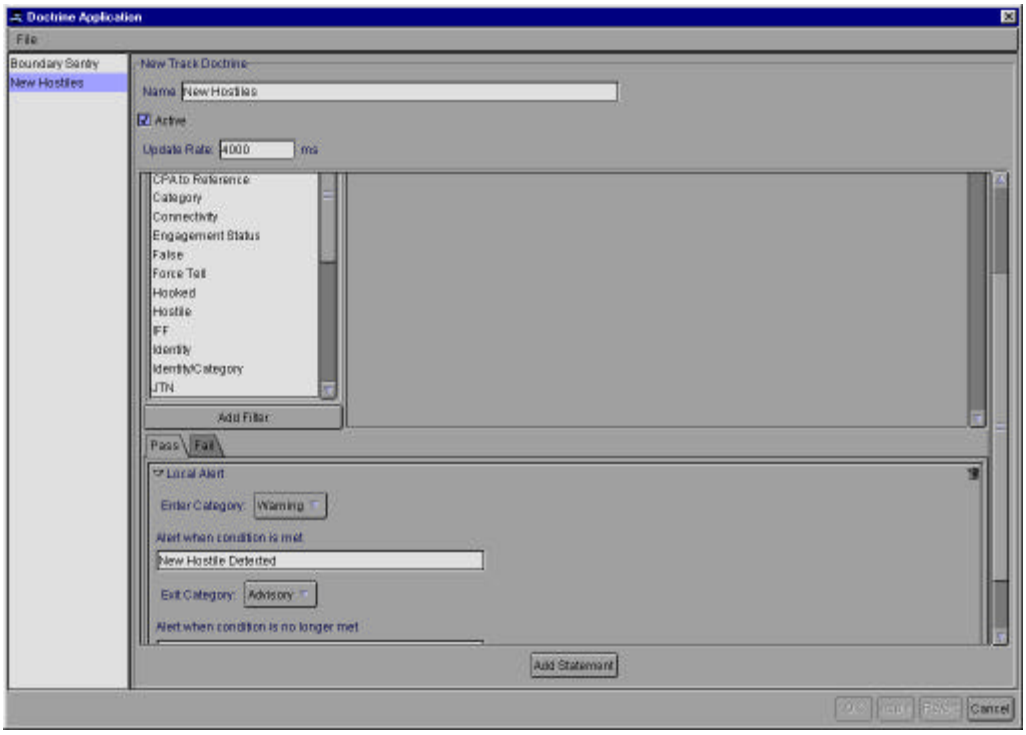

Figure 48. Doctrine Application

Create a New Hostile Recognition Doctrine (Figure 48):

1. Select File >> Add Doctrine
2. Type in a name: New Hostiles
3. Choose a doctrine type: New Track Doctrine
4. Left-click Add
    a. Note: Active toggles the doctrine on and off.
5. Change update to 3000 ms (milliseconds)
6. Select Add statement >> Conditional
7. Choose the condition, Hostile, and Press Add Filter or double left-click on the condition
8. Slide right slider down until Pass/Fail tabs appear
9. Select Pass tab
10. Press Add Action >> Choose Local Alert
11. Expand the action by left-clicking the arrow
12. Choose Warning from Category pull-down menu
13. Type Hostile Entering Airspace
14. Select Apply or OK

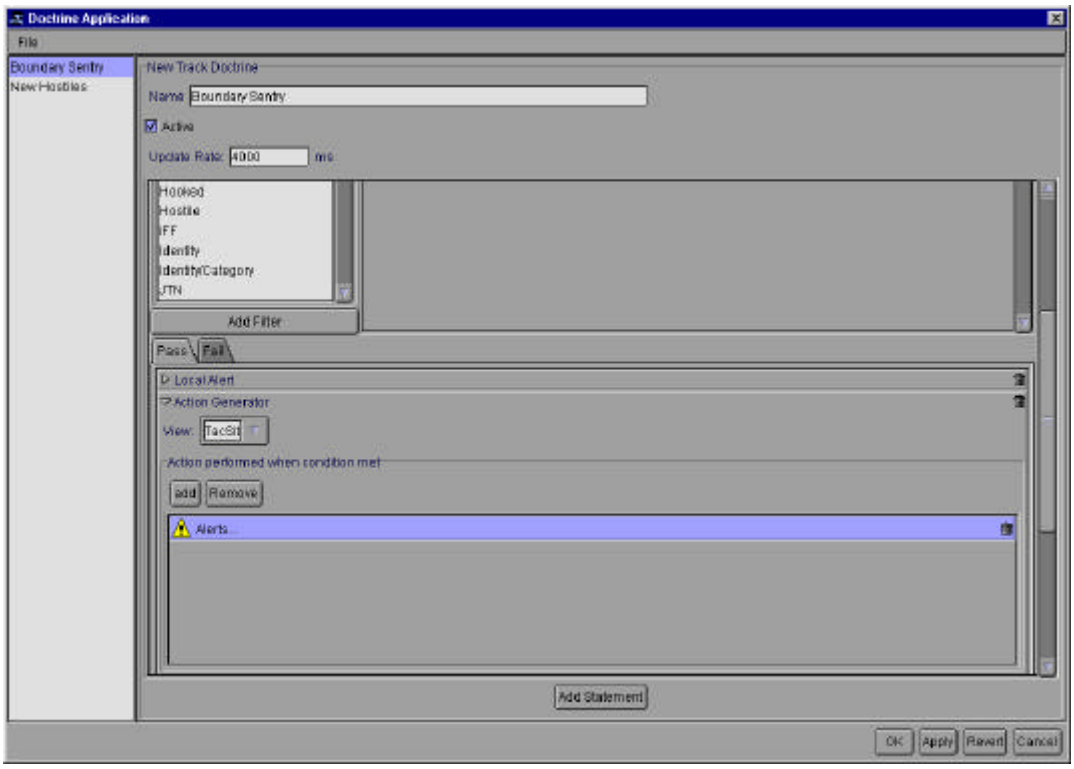

Figure 49. Doctrine Example

Create a Boundary Sentry (Figure 49):

1. While in the main display, create an overlay with shortcuts in control bar
2. Select File >> Add Doctrine
3. Type in a name: New Hostiles
4. Choose a doctrine type: Track Doctrine
5. Left-click Add
    a. Note: Active toggles the doctrine on and off.
6. Select Add statement >> Conditional
7. Choose the condition, Overlay, and Press Add Filter or double left-click on the condition
    a. Note: This creates a boundary.
8. Expand the action by left-clicking the arrow
9. Press Select button: browse, choose, and left-click select
10. Slide right slider down until Pass/Fail tabs appear
11. Select Pass tab
12. Press Add Action >> Choose Local Alert
13. Choose Warning from Category pull-down menu
14. Type Track Entering Boundary $D ($D - displays alert trigger)
15. Choose Caution from second Category pull-down menu
16. Type Exiting Boundary
17. Press Add Action

18. Choose Action Generator
19. Expand the action by left-clicking the arrow
20. Choose Add from: Action Performed when...
21. Left-click Applications arrow and select Alerts
    a. Note: Every time a track passes into the boundary the Alerts application is launched and/or brought to the front.
22. Select Apply or OK.

4.3.5 Magnifier

The Magnifier (Figure 50) is a separate display that can be configured independently of the main display. Configurations performed in applications, such as Track Presentation and Geo Options, will affect only one display at a time. Each application will have a View menu that allows the user to determine what display the user is configuring. For instance, a user could choose the one symbol set for the main display and the other for the Magnifier. Other than display options, the magnifier can also be used to declutter congested areas on the main display.

Figure 50. Magnifier

Implementing different symbol sets in different views:

1. Open Magnifier (Features>>Magnifier).
2. Open Track Presentation (Tracks>>Track Presentation).
3. Choose Tacsit in the View menu.
4. Select the NTDS symbol set.
5. Select the implementation button, Apply.
6. Choose Magnifier in the View Menu.
7. Select the MS-2525 symbol set.

8. Choose the implementation button, OK. The Magnifier and the main display will use two different symbol sets.

The pointer mode is the only navigation tool offered. A user cannot use the pan and drag modes in Magnifier, but the action menu (right-click on map) and track menu (right-click on track) are both extremely helpful in navigating maps and manipulating tracks.

Using the Magnifier:

1. Hold <Ctrl>.
2. Move the pointer over any area of the main display.

Centering the Magnifier on a selected position:

Double left click (<Ctrl> + left-click) on the Magnifier to recenter it.

Changing the selected position and range scale:

1. Double left-click (<Ctrl> + left-click) at a desired screen center position on the Magnifier.
2. Drag outward to increase its size and inward to reduce it; the Magnifier will zoom in on the defined area.

Or

1. Right-click on the Magnifier's map.
2. Choose **Range In** or **Range Out** to concentrate on an area or track.

Other Options:

1. Right-click on the Magnifier's map.
2. Choose **Slave To** in the same pop-up menu to keep the magnifier locked on a track.

4.3.6 Geo Options

The Geo Options application (Figure 51) provides the operator the ability to turn on or off various geographical features in the main display. TDF can display most of the map products available from the National Imagery and Mapping Agency (NIMA), including World Vector Shoreline (WVS), ADRG, CADRG, and CIB. Digital Nautical Chart (DNC) is currently in beta test and will be released in a future version. The Geo Options application is organized into a four-tabbed panel: Grids, Imagery, Maps, and Projection.

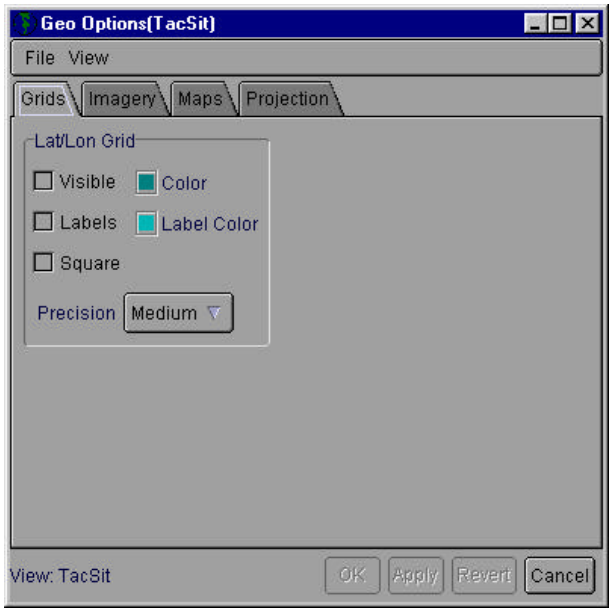

Figure 51. Geo Options Application - Grids

4.3.6.1 Grids

The Grids panel (Figure 52) allows the toggling of latitude/longitude grids and provides an option to display the labels associated with grid. Grids can be shown in fine, medium, or coarse mode and in rectangles (default) or squares. Colors of both the lines and the labels can be changed. Universal Transverse Mercator (UTM) grids are similar in appearance as the Lat/Lon Grid and are similarly configured in this panel. The Precision can be set to 1 km, 10 km, and Fine. The UTM grid for 1 km will appear when the view is very close to the earth; 10 km when farther away, and Fine even farther away.

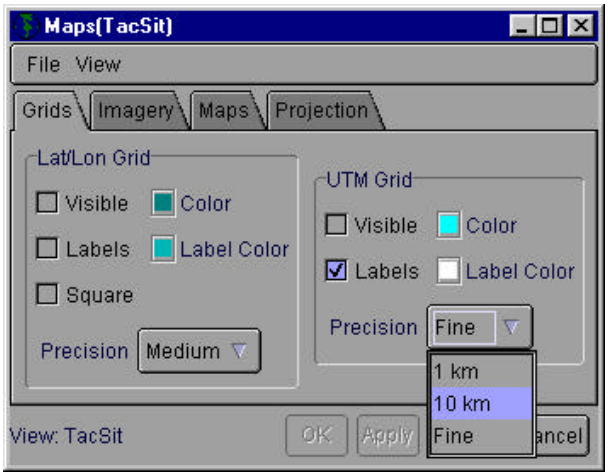

Figure 52. Grids

4.3.6.2 Imagery

The Imagery panel (Figure 53) shows the list of all available imagery and terrain data. Imagery is drawn according to the list. The top data is drawn first, which can be changed by selecting and dragging the terrain. Regarding terrain, the application will look for files that are of ten-meter resolution first and then progressively get to the least defined resolution, according to the list. Most map products are range-sensitive and only appear when at the appropriate range. For example, a CIB satellite image can only be used at a close range. The operator should lower the range scale if the correct imagery does not display on the main display.

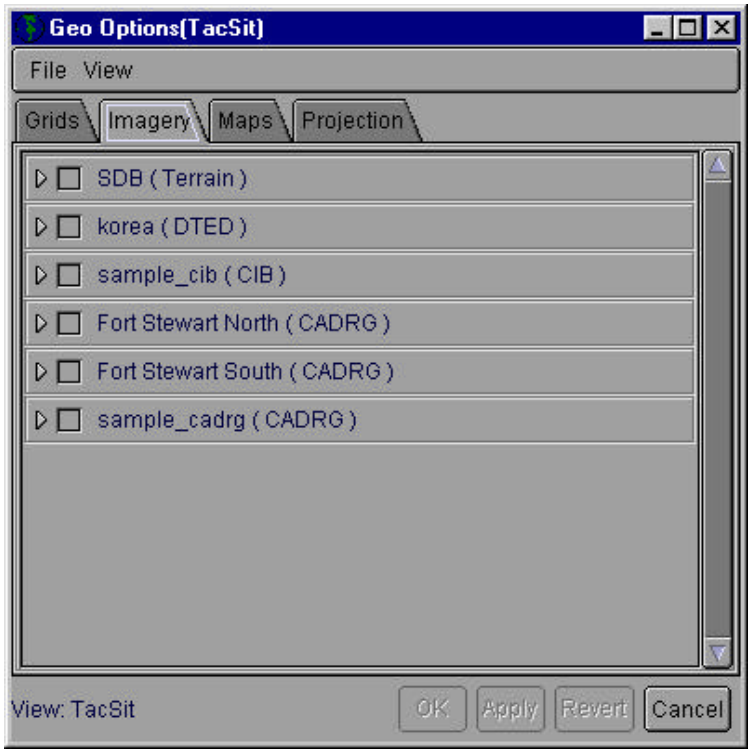

Figure 53. Geo Options – Imagery Tab

If the user toggles the arrow, editable options will appear (Figure 54). Some Imagery types have extents, which can be toggled on/off, along with the Imagery name. The filter section allows the user to configure the display of the data in various ways, such as brightness, blue, slope shading, and color.

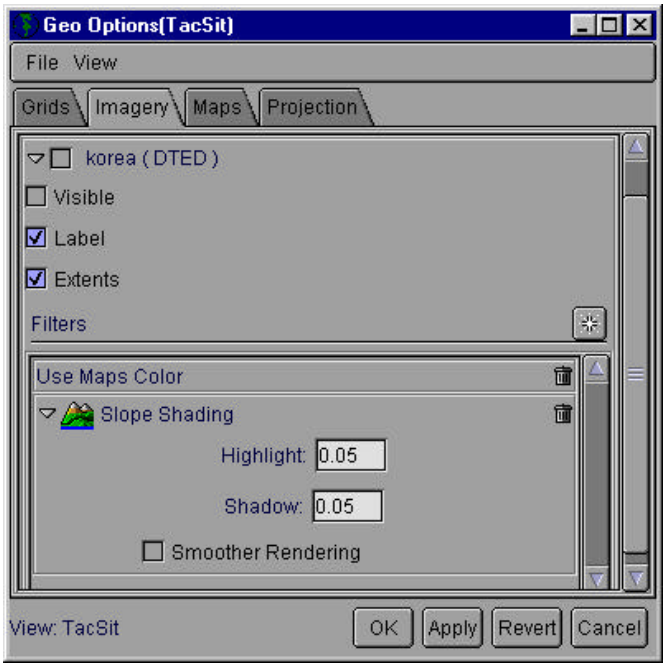

Figure 54. Geo Options – Filters

After the user selects the arrow next to the imagery desired, an asterisk will appear near the filters box, which displays filters that enhance the viewing of the product. A panel with at least six filters will appear if the user selects the asterisk icon (Figure 55): Brightness, Edge Detector, Gray, RGB Brightness, Slope Shading and Use Maps Color.

Selecting desired map filters:

1. Select arrow next to map type.
2. Left-click on asterisk.
3. Select a filter (it will be highlighted).
4. Select **Add**. The filter will appear in the filters box (see Figure 54).

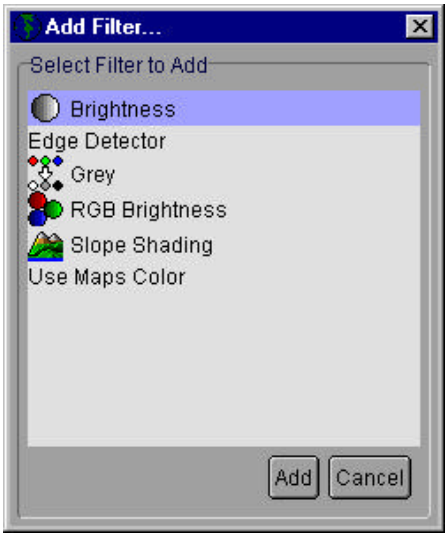

Figure 55. Geo Options – Add Filters

Although most filters can be configured, Edge Detector and Use Maps Color cannot be changed. The operator can remove filters by clicking on the trashcan icon to the right of the filter.

Changing a filter's attributes:

1. Select the arrow of a configurable filter, such as Slope Shading.
2. Change Highlight factor somewhere between 0.01-0.1.
3. Change Shadow factor somewhere between 0.01-0.1.
4. Click the check box for Smoother Rendering.
5. Select OK. Since filter order determines what imagery is drawn first, the user may want to reorder the filters.

Changing the filter order:

1. Select filter.
2. Drag to another location.

4.3.6.3 Maps

The Maps panel (Figure 56) provides the ability to toggle topographical features and alter the colors of these features, including Heliports, National Boundaries, Land Masses, Sovereign Territories, Territorial Boundaries, Supplemental Boundaries, Lakes and Rivers, Cities, and Airports. A variety of similar features can be added to this Maps section. Additional options are available by selecting the flip arrow beyond the Color and Visible options.

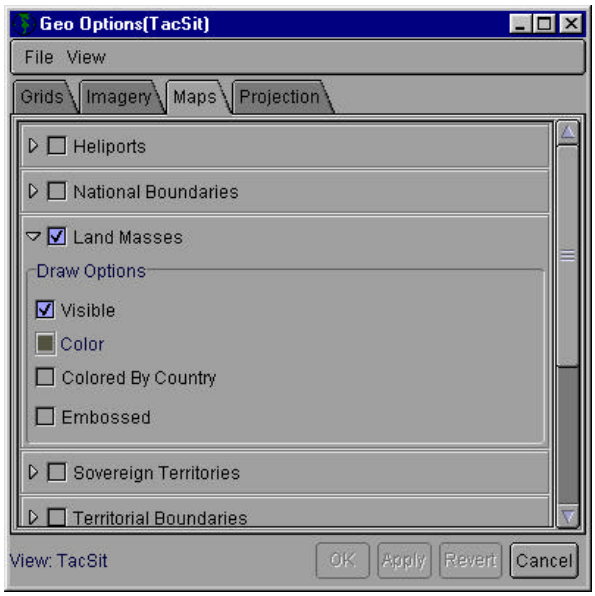

Figure 56. Geo Options – Maps

4.3.6.4 Projection

The Projection panel (Figure 57) allows the operator to change the projection algorithm used to display maps and other objects on the screen. TDF currently supports four projections: Lambert Conformal Conic, Equidistant Cylindrical, Mercator, and Orthographic (default).

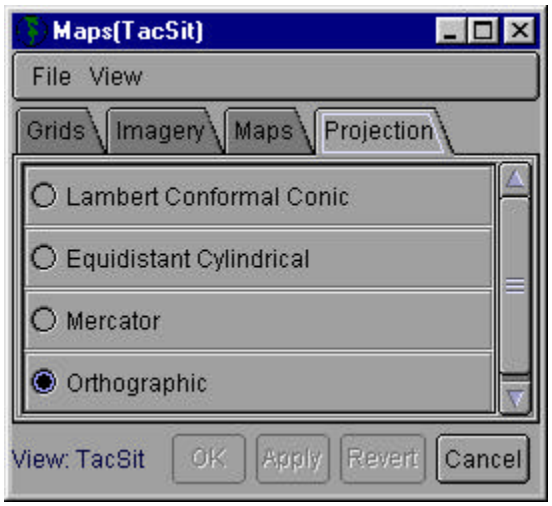

Figure 57. Geo Options – Projection

4.3.7 Marker List

The Marker List (Figure 58) program appears under Features in the menu bar. The List provides an inventory of all available markers and the tools to modify the list of them. The Markers can be sorted, hooked, hidden, filtered, and saved. The Marker List is similar to both Pairings List and Track List.

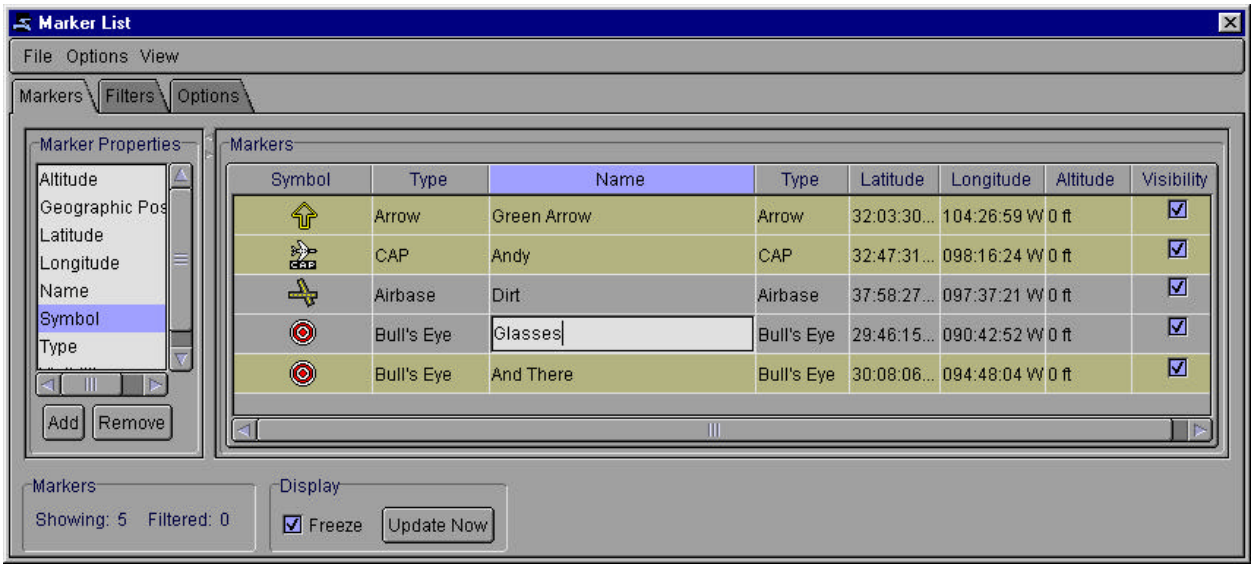

Figure 58. Marker List

At first, the user will see three tabs, Markers, Filters, and Options on the left, the Marker Display on the right, and the Status Footer at the bottom. Completely pluggable, the Marker Properties List on the left of the Marker Display enables a variety of plug-ins to be added to the Display. The Display is a list of all markers in the database and the recipient of any changes made elsewhere in the Marker List. Modifications such as hooking and renaming will affect both the list and the main display, but any filters applied to the list will not be applied to the main display.

The Marker Property List on the left of the Marker Display enables a user to add a variety of plug-ins to Display. Properties can be selected one at a time or in groups.

Creating a new Marker List:

1. Choose Marker List from the Features menu in the main menu bar.
2. Select one of the following methods to choose a few properties.
3. Double left-click on desired properties from the Marker Properties List or left-click + press Add.
4. OR Hold Shift + left-click to select more than one property consecutively and press Add.
5. OR Hold Cntrl + left-click to select non-consecutive properties and press Add.

Adding and Removing Properties:

1. Right-click on the column header.
2. Select Insert from the pop-up menu.
3. Select a property from the pop-up menu to insert it into list.

OR

4. Right-click on the column header.
5. Select Remove from the pop-up menu.
6. Select a property from the pop-up menu to remove it the list.

Adjusting the Columns:

1. Left-click + drag one column header to the right or left.
2. Place the pointer between two columns; it will change into a double arrow
3. Drag the column's left or right margins to resize.
4. Choose Options >> Row Height
5. Move the slider right to increase the size of the rows and left to decrease it

Sorting by a Property:

1. Double left-click on the column header until the right sort direction is achieved.

OR

2. Right-click on the column header.
3. Select the desired sort option from the pop-up menu.

Saving and retrieving a Marker list layout (.prl):

1. Choose the File menu >> Save As.
2. Type in a file name and choose Save.
3. LATER Select the File menu >> Open.
4. Browse for file, select it, and click Open.

4.3.7.1 Operations Menu

The Operations Menu (Figure 59) will contain many different capabilities depending on the configuration. Yet, there are five default commands, Center On, Hook, Unhook, Hide, and Show All, included in all configurations. These commands permit a user to group and filter options. The first two commands, Hook and Unhook, permit the operator to group the tracks using point and click methods discussed earlier. The Primary hooking color-code is tan, and the Secondary hooking color-code is green. The Hide command filters all selected or unselected tracks, as appropriate. The number of Markers that are filtered and ones that are shown are listed in the Status Footer. Show All overrides Hide.

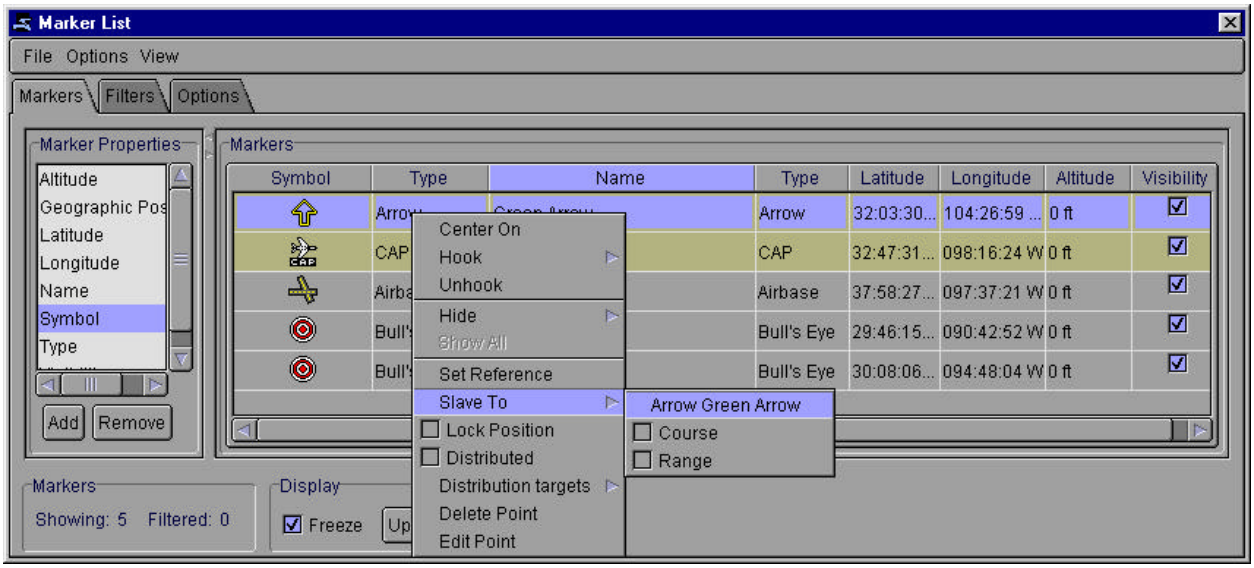

Figure 59. Operations Menu

The Status Footer permits controlled updating and freeze-screen capabilities. This gives an operator time to deliberate on choices before the tracks in question change position in the continuously updating Pairing Display. Without freeze screen, the rows of tracks will move throughout the list according to that track's attributes.

Hooking tracks:

1. Cntrl + left-click to select a few rows.
2. Right-click anywhere on the highlighted region.
3. Choose Hook selection from the pop-up menu.
4. Choose Primary (Tan) or Secondary (Green) from the sub-menu. The rows hooked in the Pairing List should also be visibly hooked on the main display.

Freezing and hooking tracks:

1. Toggle Freeze in the status footer ON.
2. Right-click anywhere on the highlighted region.
3. Choose Hook selection from the pop-up menu.
4. Toggle Freeze OFF. Tracks will not update when frozen.

4.3.7.2 Options Menu

The Options menu enables the operator to toggle sections of the Marker List:

1. Toggle Properties to remove the list of track properties (left).
2. Toggle Status to remove the Status Footer (bottom).

4.3.8 Multigraph

The Multigraph application (Figure 60) provides a flexible way to graph track attribute data for numerous hooked objects. It allows the user to place any of the following attributes on the X- or Y-axis: altitude, bearing, course, latitude, longitude, range, and speed.

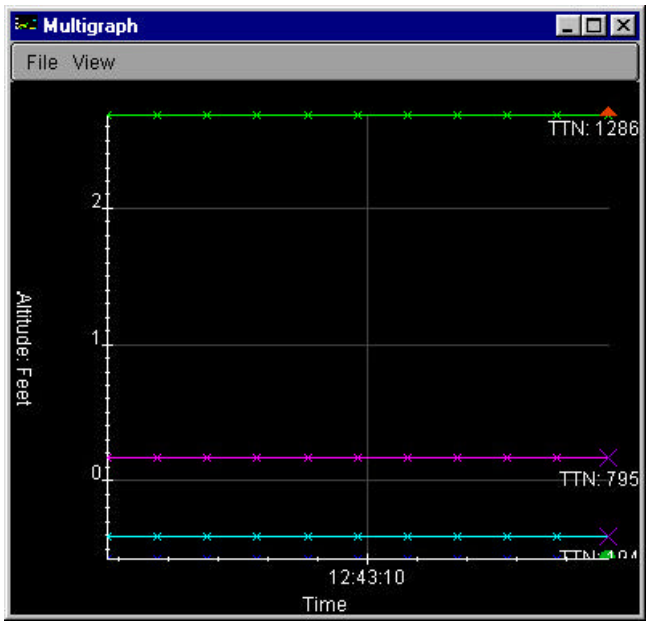

Figure 60. Multigraph Application

4.3.8.1 View Menu

The axis selections are found under the View pull-down menu as shown in Figure 61. The default option is to graph altitude versus time.

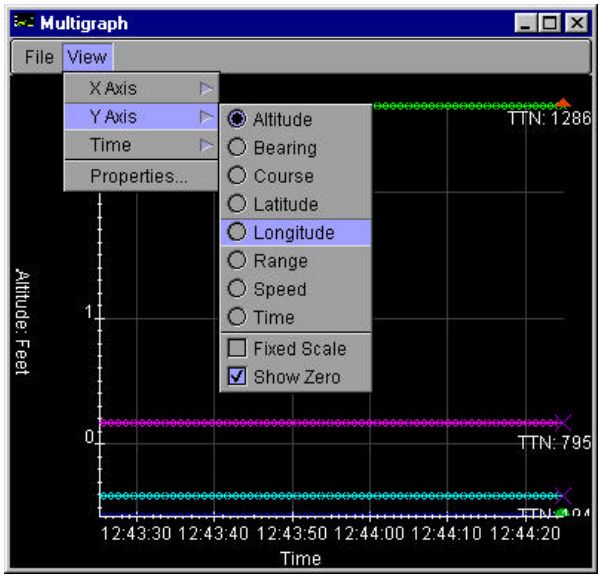

Figure 61. Multigraph – View

The Properties selection permits the user to vary the display properties of the X- and Y-axis. By default, Multigraph automatically scales the X- and Y-axis based on the range of values that are being graphed. The user can clamp or fix the range of values to certain minimum and maximum values through this panel.

Making a new graph:

1. Select the tracks that need to be graphed.
2. Choose **Altitude** from the View pull-down menu as the X-axis.
3. Choose **Time** from the same menu as the Y-axis.
4. Select **Time** as one minute, so it will register every minute.

Narrowing the field:

1. Select **Properties** from the View pull-down menu and choose **Fixed Scale**.
2. Select the Y-axis tab.
3. Click the check box next to Fixed Scale.
4. Add a minimum of 100 feet to ensure only aircraft will register.

4.3.9 Overlay

The Overlay application (Figure 62) permits the user to create, save, and display overlays of various shapes (Four Whiskey, sectors, washers, circles, polygons, rectangles, lines, etc.) in the main display. Overlays can be used for any number of applications, which may include boundary zones, doctrine areas, op areas, and free-fire zones. They can be either fixed or slaved and can be configured to provide operator alerts when objects enter or exit their boundaries.

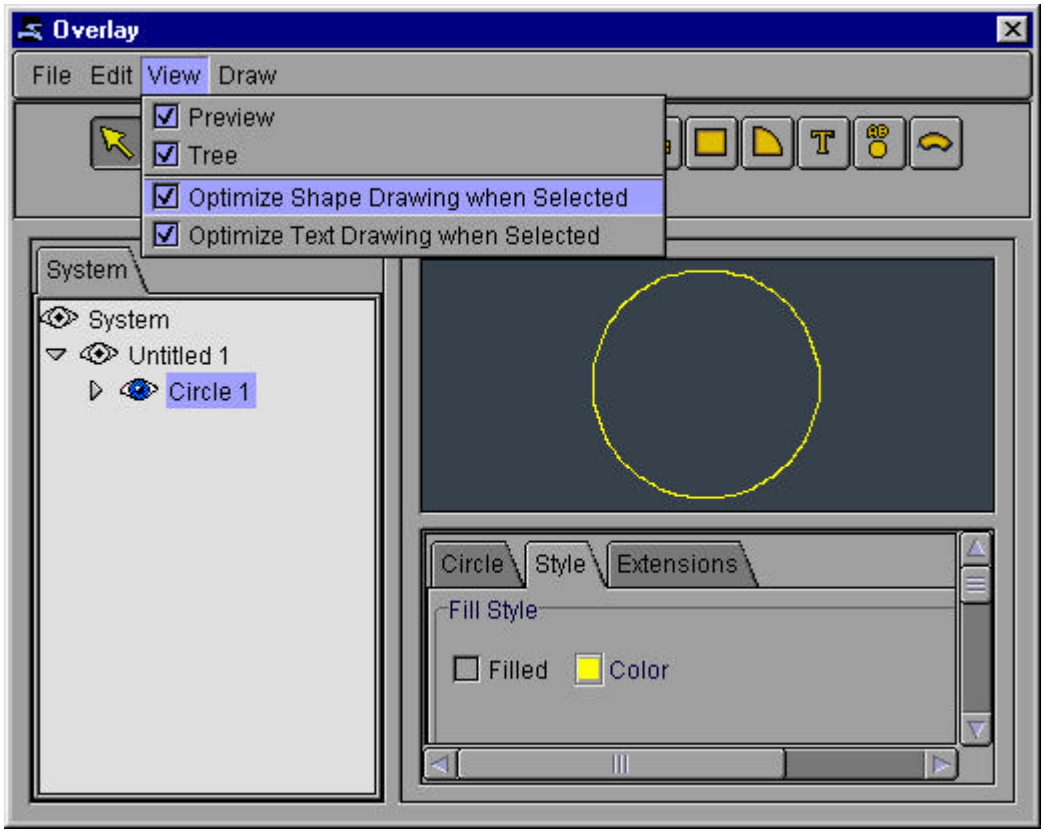

Figure 62. Overlay Application

4.3.9.1 Overlay – Menu Bar

The Overlay application (Figure 62) has a menu bar at the top with four pull-down menus: **File**, **Edit**, **View**, and **Draw**. The File menu in Overlay contains the same functions as other applications, except for the **Revert All** option, which returns the overlays to the most recently saved state.

The Edit menu has numerous options including copy, cut, paste, duplicate, delete, create a new overlay group, rename an existing overlay group, and center the main display on the current overlay.

The View menu includes checkboxes to toggle the hierarchy tree and the preview, which are both toggled off by default. It also includes checkboxes to toggle optimal shape and text drawing.

The Draw pull-down menu provides the ability to flip and rotate the current overlay. Overlays can be flipped in both the horizontal and the vertical directions as well as rotated left and right 90 degrees.

4.3.9.2 Overlay Tree Hierarchy

The hierarchical tree control (Figure 63) is central to Overlay. Previously created overlays can be shown or hidden, either individually or by groups, by selecting the eye icon to the left of the overlay name. The blue eye icon indicates that the overlay or overlay group is toggled on, while the white eye icon indicates the overlay is toggled off. Click on System to highlight every group and overlay in the tree. The system includes all groups, and the groups include all overlays.

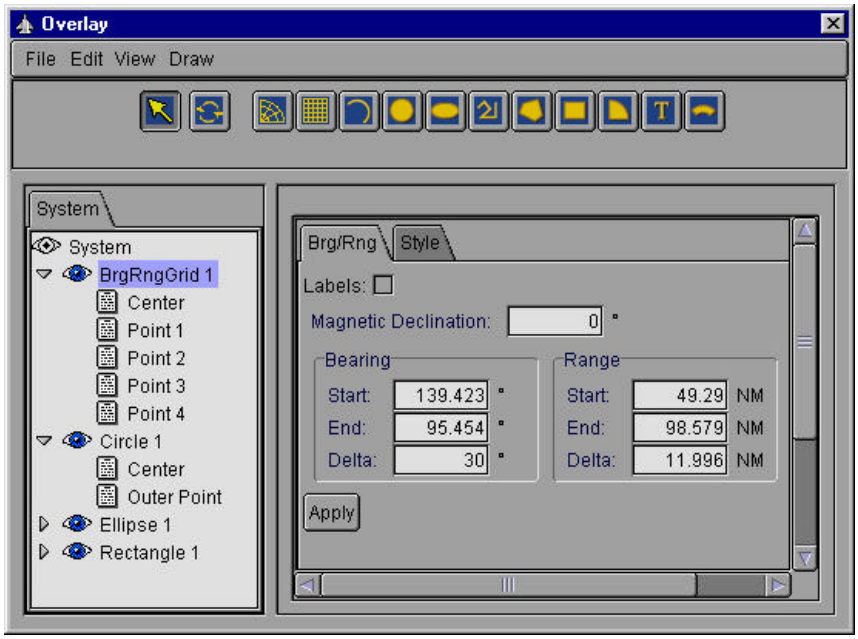

Figure 63. Overlay – Tree Hierarchy

The Overlay application supports the creation of user-defined bearing-range grids shown in Figure 63. For bearing-range grids, it provides the ability to specify bearing and range start/stop positions, deltas, and textual indications. For Four Whiskey grids, the user can specify the color, width, height, and increment (in degrees). While the Overlay application is active, the currently selected overlays will not draw in the main display. The operator must click outside of Overlay for the overlays to draw; however, if the preview option in the view menu is toggled on, a small screen with a blue background will appear. To see what is being created, highlight the shape name in the tree to display the shape in the preview window.

4.3.9.3 Creating and Modifying Overlays

Although configuration choices change per overlay, there are three major tabs: Shape, Style, and Extensions. The first tab is very specific to an overlay's shape. It enables the user to configure the position of the overlay on the main display. When a shape is selected, an editor appears in the lower, right-hand corner of the overlay control panel. Each shape has its own

editor. The shapes are configured with control points. These are located in the tree control. The control point editor has a latitude/longitude editor that can change the position of the control point. This is equal to dragging the control point on the view, but it allows the user to enter a specific latitude/longitude position.

The Style tab is available for every shape: Fill and Line Style. If the shape can be filled with color, Filled will be an option. Text (T icon) also includes a pull-down menu for font type and size; toggles for size bold and italics; and a swatch for color. Use Line Style to further configure the overlay; change the color, width of the line from four pixels to two, or its template. All editors have **Apply** buttons that must be selected to accept the changes.

1. Select group to change Style
2. Toggle F**illed** on and choose a color
3. Configure Line Style

Most shapes also include an Extensions tab used to distribute the overlay to other participants on the network. Information in the editor varies from shape to shape. A few highlighted shapes are discussed below:

Creating any overlay shape:

1. Select group to add an overlay and then select desired shape
2. Or just select desired shape to create a new group automatically
3. Left-click in the main display to place overlay
4. Activate the Overlays window (The overlay panel will fill with any information pertinent to that type of shape)

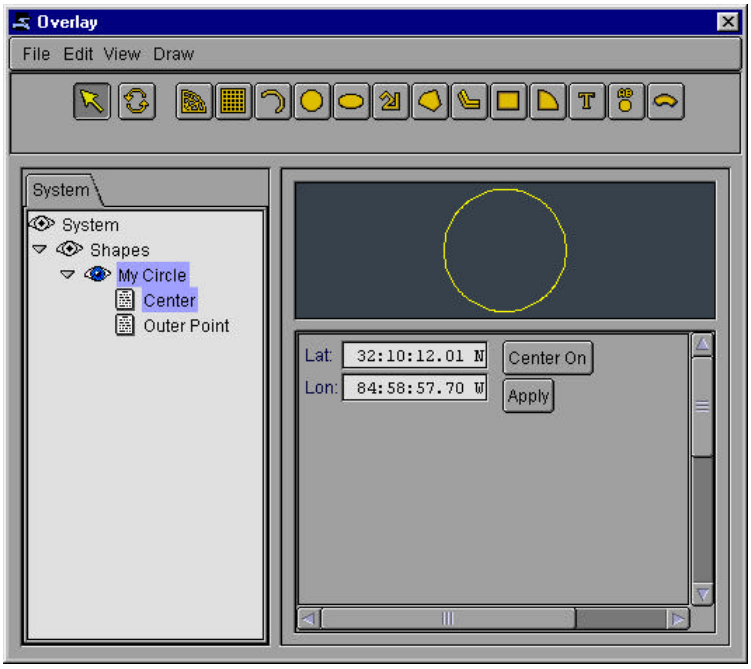

Figure 64. Creating a Circle

The Circle tab includes entry fields to specify the exact locations of the vital points in a circle: Radius, Center Point, and Outer Point.

Create and configure a Circle (Figure 64):

1. Select Circle icon and draw on main display
2. View >> Rename Circle to My Circle
3. Select Circle tab
4. Highlight My Circle in the tree to alter its radius (overall size)
5. Highlight Center in the tree to change its lat and lon (location)
6. Highlight the Outer Point to change its radius(size based on the distance between center and outer points)
7. Choose Apply within window
8. Choose T from icon bar
9. Left-click on main display near the circle
10. Choose position of the left (and only) point either on the main display or within the overlays window
11. Type words or numbers in the text field

Using Transparency:

1. Create a circle with directions above
2. Choose Style tab
3. Left-click on color swatch
4. Choose color

5. Slide the Transparency Slider to 80
6. Left-click the x in the top, right-hand corner to close

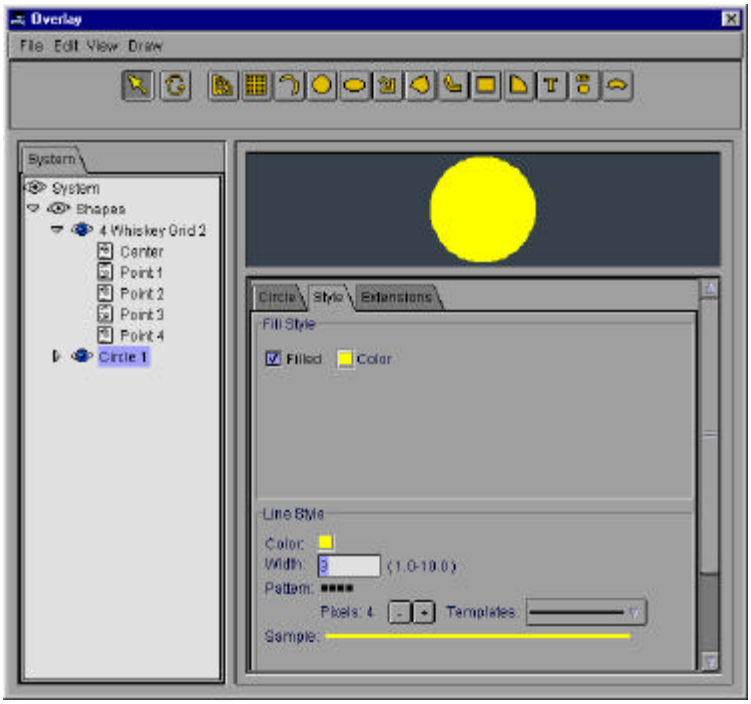

Figure 65. Style Tab

Configure Four Whiskey Grid:

1. Enter a width
2. Enter a height
3. Enter an increment (the amount of grid intersections)
4. Change Style to personal choice
5. Toggle **Distribute** on in the Extensions tab
6. Select Center and Points 1-4
7. Enter lat/lon locations to the windows
8. Select Apply

Creating a Line:

1. Select the line icon
2. Place first point on main display
3. Continue to place subsequent points until desired shape is achieved
4. Select the pointer icon in the Overlays application
5. Configure line

Modify an existing overlay:

1. Left-click on the desired overlay in the main display or in the tree

2. Use the Overlays application to modify the overlay's attributes
3. Or right-click on an overlay to access the action menu and select to enact a change. This menu offers similar options to the Overlays application

Changing an overlay's size:

1. Left-click and hold the mouse button down
2. Drag the outer control points of the overlay

Moving overlay:

1. Left-click and hold the mouse on the center control point of the overlay until a four-pointed arrow appears
2. Move the overlay to the desired location

Deleting, flipping, rotating, cutting, copying, pasting, or renaming an overlay:

1. Right-click on the overlay, a pop-up window will appear
2. Left-click on the appropriate selection in the pop-up window

Rotating an overlay:

1. Select the rotator icon near the pointer in the Overlay application
2. Rotate the overlay on the main display
3. Select the pointer icon in the Overlay Application
4. Activate the main display for drawing

4.3.9.4 Modifying Group Qualities (Boundary)

Groups are main nodes in the tree. When a group of groups (top of tree) or a group is selected, two major characteristics can be applied to all elements within those groups: Category and Zone Type. Category describes the relationship the overlay will have with the main display or other tracks. The Zone Type is either a boundary or not. The configurable options in these two categories are listed in Table 21 below:

Table 21. Group Configuration Options

Category	Fixed	Fixes current position
	Slaved	Slaves overlay to track
	Slaved to Heading	Slaves overlay to the direction the track is moving (or front of the track)
	Slave to Hook	If Slaved is chosen, a user can slave the overlay to the most highlighted hooked track

		Slave to Number	If Slaved is chosen, a user can slave to the overlay to a specific track. Choose a category from the pull-down menu and enter the track number or callsign into the text field
Zone Type		None	No zone is designated
		Boundary	Designates a zone that stimulates alerts when tracks enter or exit
	Altitude	Min	Minimum altitude threshold to stimulate alerts (Does not function when None--Zone Type--is chosen) Right-click on the measurement to change its unit of measure
		Max	Maximum altitude threshold to stimulate alerts
	Speed	Min	Minimum speed threshold to stimulate alerts Right-click on the measurement to change its rate
		Max	Maximum speed threshold to stimulate alerts

Creating a boundary alert:

1. Create an overlay with instructions above
2. Activate Overlay application
3. Choose the eye icon in the hierarchy above the shape
4. Select boundary in the Zone Type pull-down menu. The boundaries of the shape will now be the boundaries of the alert field
5. Add altitude and speed thresholds in the necessary fields if necessary
6. Select **Apply**
7. Open the Alert application

4.3.9.5 Weapons Engagement Zones

The Weapons Engagement Zones (WEZ) in Figure 66 are modified overlays in TDF. They are highlighted zones proceeding conically in front of a track. These shapes can be slaved to the heading of the track, always preceding the track. After a track is hooked in the main display and ADD WEZ is selected from the right-click menu, a WEZ can be configured in the Overlays application. By default, the WEZ is the second tab in the Overlay application.

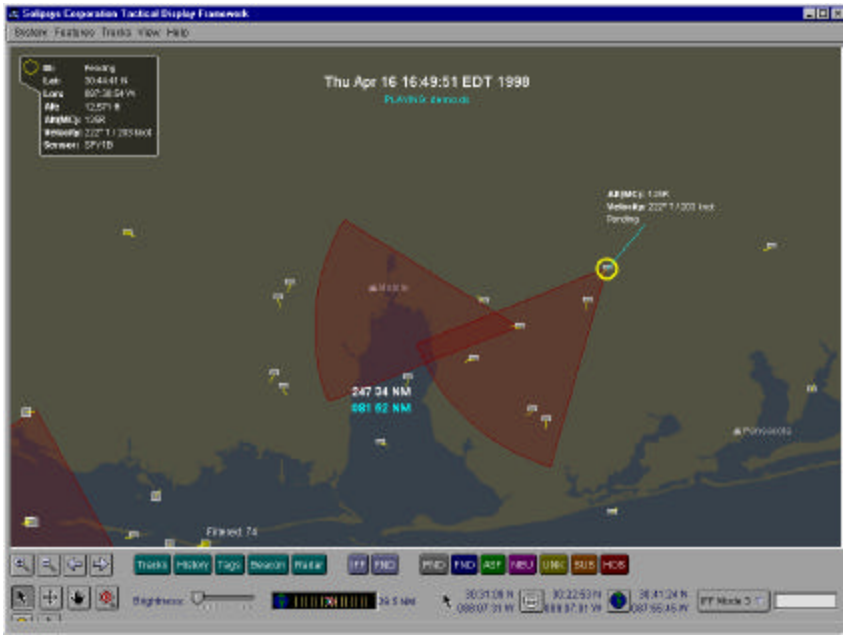

Figure 66. Weapons Engagement Zones (WEZ)

Activating WEZ:

1. Right-click on a track
2. Select Add WEZ
3. Open Features >> Overlays application
4. Select the track number from the tree to change its properties (Choose the top of the tree to configure all tracks and the group to configure its tracks)
5. Refer to Table 21 for option descriptions

Configuring WEZ:

1. Select the sector (describes the size of the WEZ) from the tree
2. Increase radius default value from 25 to 50 in order to enlarge the WEZ
3. Or decrease its value to shrink the WEZ
4. Change the span of Angle 1 from 330 to 220 to enlarge the spread of the zone (An entire circle is not an option)

4.3.10 Range Bearing Grid Editor

The Range and Bearing Grid Editor (Figure 67) provides a configuration mechanism to the pop-up grid on the main display.

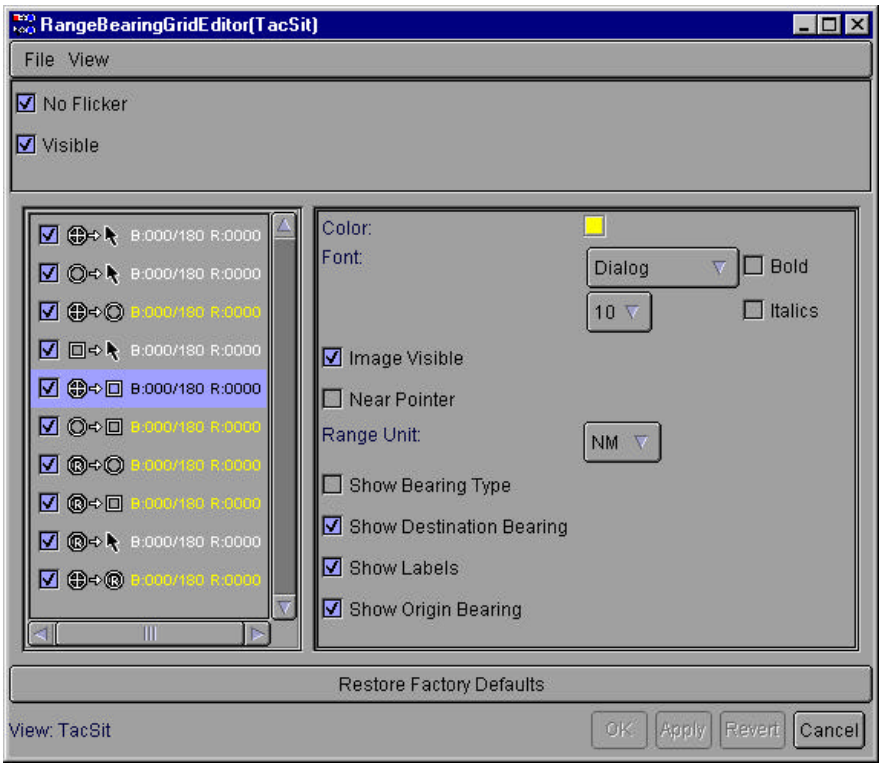

Figure 67. Range Bearing Grid Editor

4.3.11 Settings

The operator is presented with checkboxes for the major Range Bearing Grid settings, **No Flicker** and **Visible**. The No Flicker option allows the operator to take a slight performance penalty in order to have the grid not flicker on the main display every time the mouse is moved. When a large number of tracks are active, this performance deficit can be quite noticeable. The Visible setting toggles the grid in the main display or any other selected View.

4.3.12 Content Control

The split panel beneath the settings enables independent configuration of each line in the grid. If multiple lines are selected (Cntrl + left-click, Shift + left-click), then the right panel will edit all of the selected grid lines. Using a drag and drop technique, the operator can reorder the entries in the selection panel.

In the editing panel (right side of the panel), it is possible to select all of the display attributes for a given line (or group of lines). Table 22 includes configuration options.

Table 22. Edit Options

Options	Action
Color	Changes the readout's color with either a color swatch or a RGB slider.
Font	Changes dialog size and style.
Image Visible	Toggles the readout on and off.
Near Pointer	Places the readout near the pointer
Range Unit	Determines unit of measurement used for the final range output
Show Bearing Type	Toggles the True vs. Magnetic indicator on the range/bearing line.
Show Destination Bearing	Toggles bearings from the destination to the origin.
Show Labels	Toggles (Displays/Suppresses) text 'BRG:' and 'RNG:' on the range bearing line.
Show Origin Bearing	Toggles bearings from the origin to the destination.

Beneath the selection and editing panels lies a Restore Factory Defaults button, which restores the original colors, ordering, and fonts from initial installation. Below this button, a current view indicator and a set of control buttons are displayed.

4.4 Tracks

The following applications are available under the Tracks pull-down menu on the menu bar.

4.4.1 History Presentation

History Presentation (Figure 68) allows the user to configure the collection, display, and color of track history points in a display, including the main display and the magnifier. History points are markers that signify a track has been reported at that geographic position. The user can select to have history saved for all tracks, no tracks, or selective categories of tracks. In addition, a user can code these history points to display any available data, from reporting sensor to responsibility.

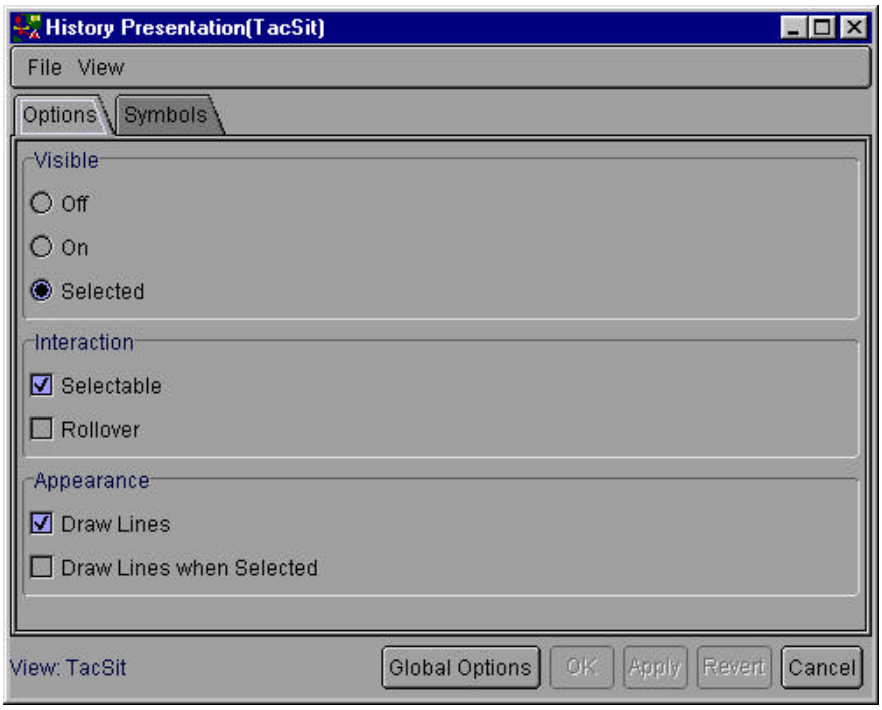

Figure 68. History Presentation

4.4.1.1 Options

The Options panel enables the operator to configure what history points are shown on the display. A user can select whether or not history points are always shown, never shown, or shown only when selected. Figure 68 shows a configuration, which will cause only selected tracks to display history, in order to minimize screen clutter. Table 23 gives a brief explanation of the options.

Table 23. History Options

Options	Action	
Visible	Turns the history on, off or when a track on the display is selected (actively hooked).	
Interaction	Selectable	Makes history points selectable and enables the details windows for the point.
	Rollover	Enables a user to rollover a history point.
Appearance	Draw Lines	Toggles lines between history points.
	Draw Lines when Selected	Turns on lines between history points only when selected on the display.

4.4.1.2 Symbols

The Symbols panel (Figure 69) permits a user to configure how history is rendered on the screen. With the Size tab, the size of history points appearing on the main display can be changed. With the Color tab, the user can color history points according to an available category. The categories include Identity and Sensor, among many others (See Appendix B).

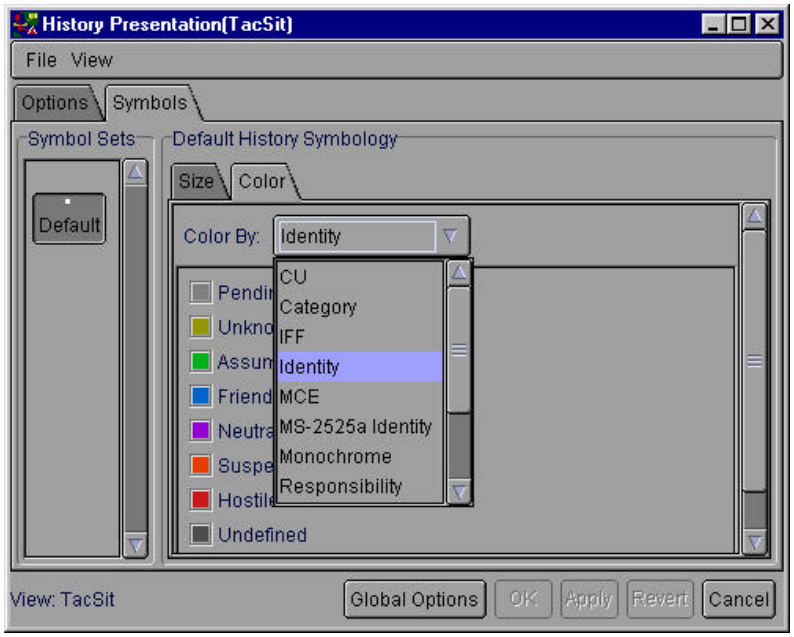

Figure 69. History Presentation - Symbols

Changing the color of history points:

1. Choose a category to color by, for instance Identity
2. Left-click on the box next to a history type, such as **Pending**.
3. Pick a color from the swatch or choose a specific color from the RGB slider

4.4.1.3 Global History Options

The Global History Options panel (Figure 70) controls how TDF collects history. At the top of the panel, the user can select a type of collection from the pull-down menu. The collection options include No History and Default History. If No History is selected, a track's data will be lost when new updates occur. TDF runs faster and uses the least amount of memory when No History is selected. Default History enables history collection. The other sections on this panel, Trim Params, Sample and Segment Type offer configuration options for history compilation.

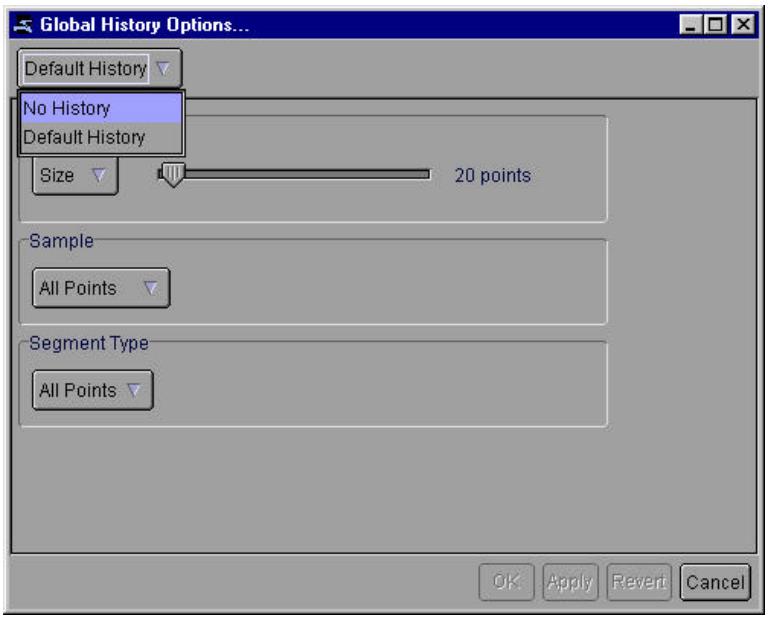

Figure 70. History Presentation – History Collection

4.4.1.3.1 Trim Params

History points are eventually dropped. By default, this event occurs based on either the time lapsed or the number of points collected. The desired time or number can be decreased or increased by moving the slider left and right. For optimization reasons, history is trimmed some time after the conditions are met.

4.4.1.3.2 Sample

The default history collector can collect every point it receives, or a certain number of points. The operator can select Skip Points to configure the desired skip count.

4.4.1.3.3 Segment Type

The default history collector has the capability to accept plug-ins that can create segments between history points. TDF currently does not have any of these segmentors, so there are no available options.

4.4.2 Hook

The Hook application (Figure 71) allows the operator to search the track database for objects containing a variety of conditions, such as DTN, JTN, CU, and IFF Modes 1-4. All objects, which match the search criteria, are hooked in the main display. If a track needs to be hooked based on some condition, the operator should use the hook window. If an object in the main display needs to be hooked according to its geographic location, the operator should select

the object using one of the mouse techniques discussed in Section 1.3. A single asterisk '*' used by itself will search and hook all objects with the condition selected from the pull-down menu.

Figure 71. Hook Application

If the user rolls over a Details window (available after tracks are hooked), the Details screens will darken while two arrows and a menu appears in the upper-left corner of the Details screen. An operator can use keyboard strokes, Page Up or Page Down for primary hooks (Shift + Page Up or Page Down for secondary hooks), or select one of the aforementioned arrows in the details window. The menu icon lists the hooked objects by number, so the user can jump to the wanted track without cycling through all hooked tracks.

4.4.3 Pairing List

The Pairing List (Figure 72) program appears under Tracks on the menu bar. The List provides an inventory of all available pairings data. The operator can configure and manipulate the pairings. The Options Menu on the main menu bar allows the user to display all tabs, or isolate the tabs and hide the properties and status footer. Using the operations menu (Figure 73), the operator can perform various actions to the pairings, which are described below.

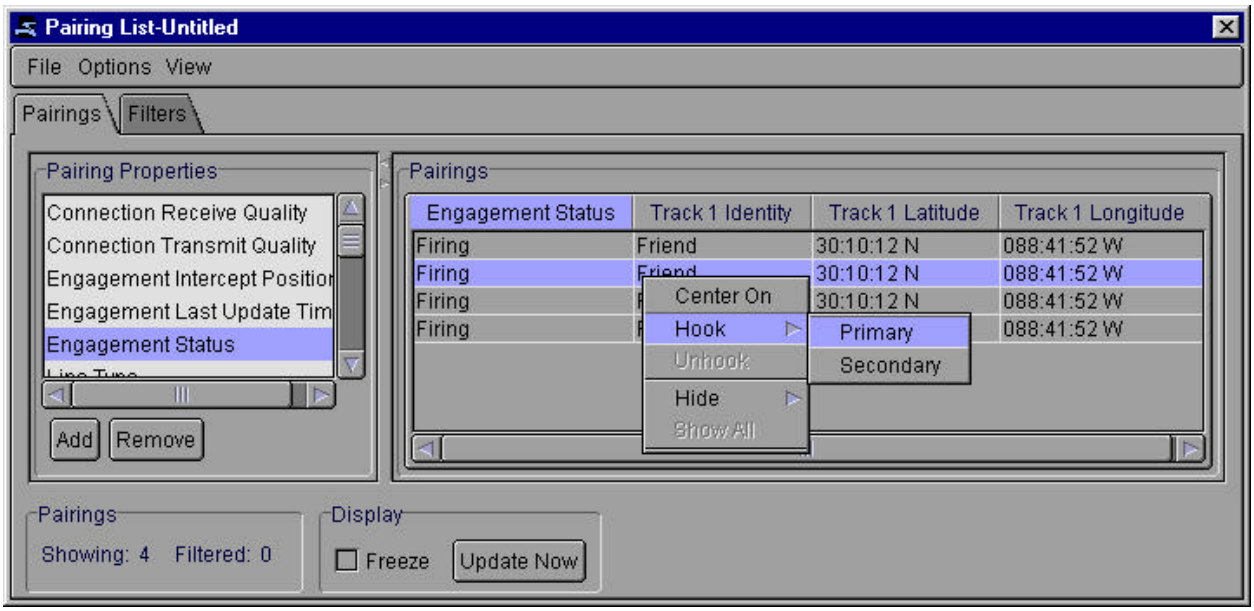

Figure 72. Pairing List

At first, the user will see two tabs, Pairings and Filters, on the left, the Pairing Display on the right, and the Status Footer at the bottom. Completely pluggable, the Pairing Property List on the left of the Pairing Display enables a variety of plugins to be added to the Pairing Display. The Pairing Display is a list of all pairings in the database, and the recipient of any changes made elsewhere in the Pairing List. For instance, all filters loaded in the Pairing List will not affect the processing of pairings on the main display.

The Pairing Property List on the left of the Pairing Display enables a user to add a variety of plug-ins to Pairing Display. Pairing properties can be selected one at a time or in groups.

Creating a new Pairing List:

1. Select new pairing list from the file menu. Then, select one of the following methods to choose a few properties.
2. Double left-click on desired properties from the Pairing Properties List or left-click + press Add.
3. OR Hold Shift + left-click to select more than one property consecutively and press Add.
4. OR Hold Cntrl + left-click to select non-consecutive properties and press Add.

Adding and Removing Properties:

1. Right-click on the column header.
2. Select Insert from the pop-up menu.
3. Select a property from the pop-up menu to insert it into list.

OR

1. Right-click on the column header.
2. Select Remove from the pop-up menu.

3. Select a property from the pop-up menu to remove it the list.

Adjusting the Columns:

1. Left-click + drag one column header to the right or left.
2. Place the pointer between two columns; it will change into a double arrow
3. Drag the column's left or right margins to resize.

Sorting by a Property:

1. Double left-click on the column header until the right sort direction is achieved.

OR

1. Right-click on the column header.
2. Select the desired sort option from the pop-up menu.

Saving and retrieving a Pairing list layout (.prl):

1. Choose the File menu >> Save As.
2. Type in a file name and choose Save.

LATER

3. Select the File menu >> Open.
4. Browse for file, select it, and click Open.

4.4.3.1 Operations Menu

The Operations Menu (Figure 73) will contain many different capabilities depending on the configuration. Yet, there are five default commands, Center On, Hook, Unhook, Hide, and Show All, that are included in all configurations. These commands permit a user to group and filter options. The first two commands, Hook and Unhook, permit the operator to group the tracks using point and click methods discussed earlier. The Primary hooking color-code is tan, and the Secondary hooking color-code is green. The Hide command filters all selected or unselected tracks, as appropriate. The number of Pairings that are filtered and ones that are shown are listed in the Status Footer. Show All overrides Hide.

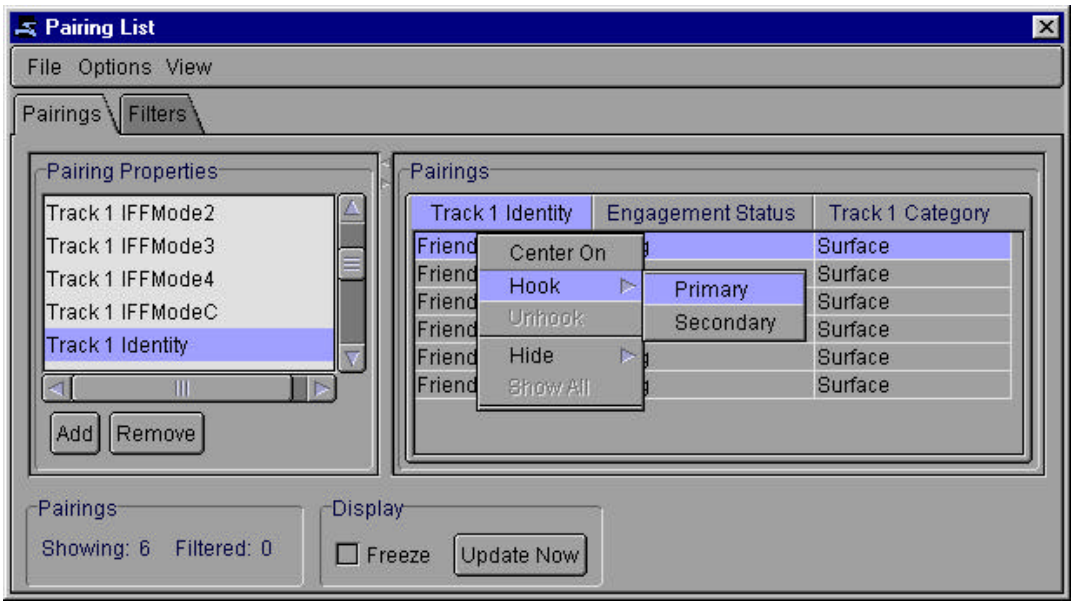

Figure 73. Operations Menu

The Status Footer permits controlled updating and freeze-screen capabilities. This gives an operator time to deliberate on choices before the tracks in question change position in the continuously updating Pairing Display. Without freeze screen, the rows of tracks will move throughout the list according to that track's attributes.

Hooking tracks:

1. Cntrl + left-click to select a few rows.
2. Right-click anywhere on the highlighted region.
3. Choose Hook selection from the pop-up menu.
4. Choose Primary (Tan) or Secondary (Green) from the sub-menu. The rows hooked in the Pairing List should also be visibly hooked on the main display.

Freezing and hooking tracks:

1. Toggle Freeze in the status footer ON.
2. Right-click anywhere on the highlighted region.
3. Choose Hook selection from the pop-up menu.
4. Toggle Freeze OFF. Tracks will not update when frozen.

4.4.3.2 Options Menu

The Options menu enables the operator to toggle sections of the Pairing List:

1. Toggle Properties to remove the list of track properties (left).
2. Toggle Status to remove the Status Footer (bottom).
3. If both are toggled off, the Menu bar, Pairing Display, and Pairings/Filters tab remain.

4.4.4 Track Presentation

Track Presentation (Figure 74) provides a large number of controls for customizing the display of track information in the main display. The application is organized into a three-tabbed panel: Features, Filters, and Symbols.

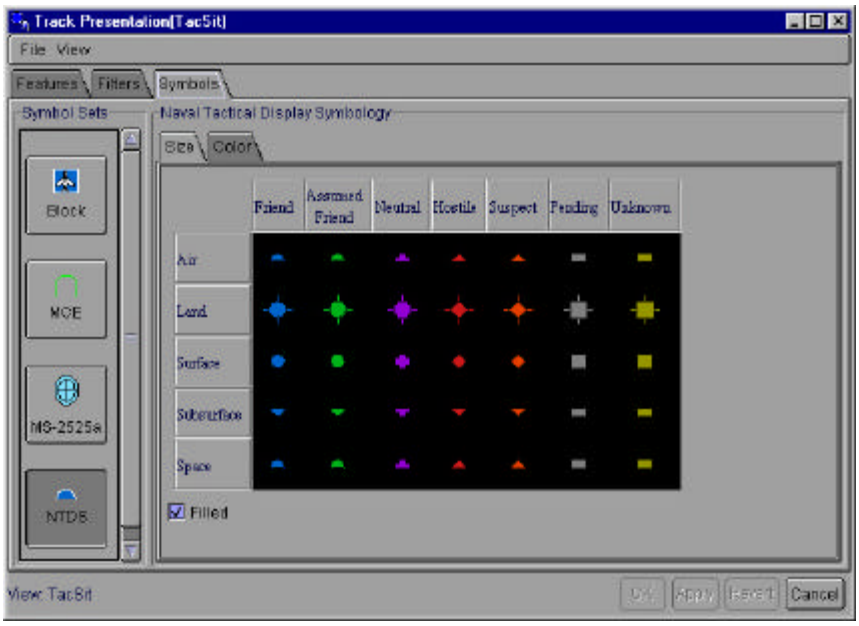

Figure 74. Track Presentation

4.4.4.1 Features

The Features panel (Figure 75) enables the user to toggle Velocity Leaders and Heading on and off. If the velocity leaders are clicked on, the user can specify the length in seconds (0 – 1020 seconds). The user can also indicate the color of velocity leaders by selecting the color box underneath. Color options include a swatch grid or RGB capabilities for precise color choice. Heading allows the user to choose the length and the color of the track heading line in pixels (0-50 pixels).

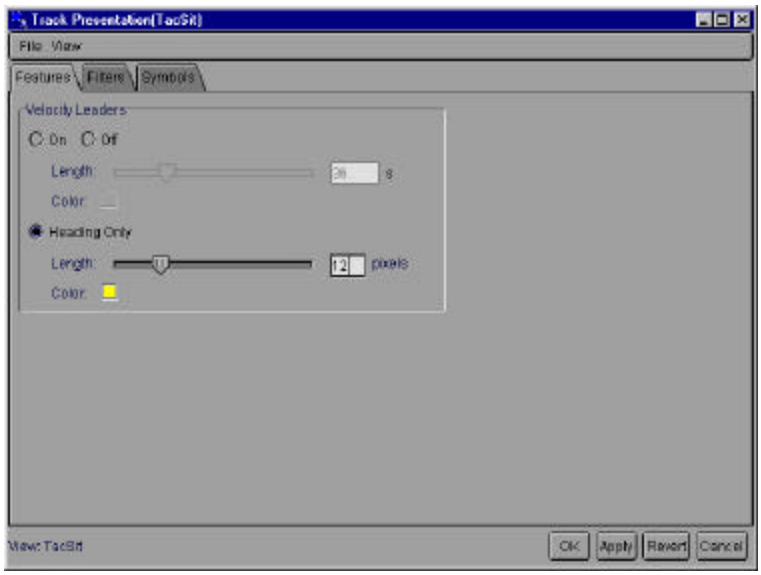

Figure 75. Track Presentation - Features

4.4.4.2 Filters

The Filters panel (Figure 76) contains two sections, the available filter list section on the left and the expression builder tabs for Always/Never Show on the right. These sections permit the operator to filter the display of information on the main display through track property specification and logical expressions utilization. (See Appendix A for a list of filters).

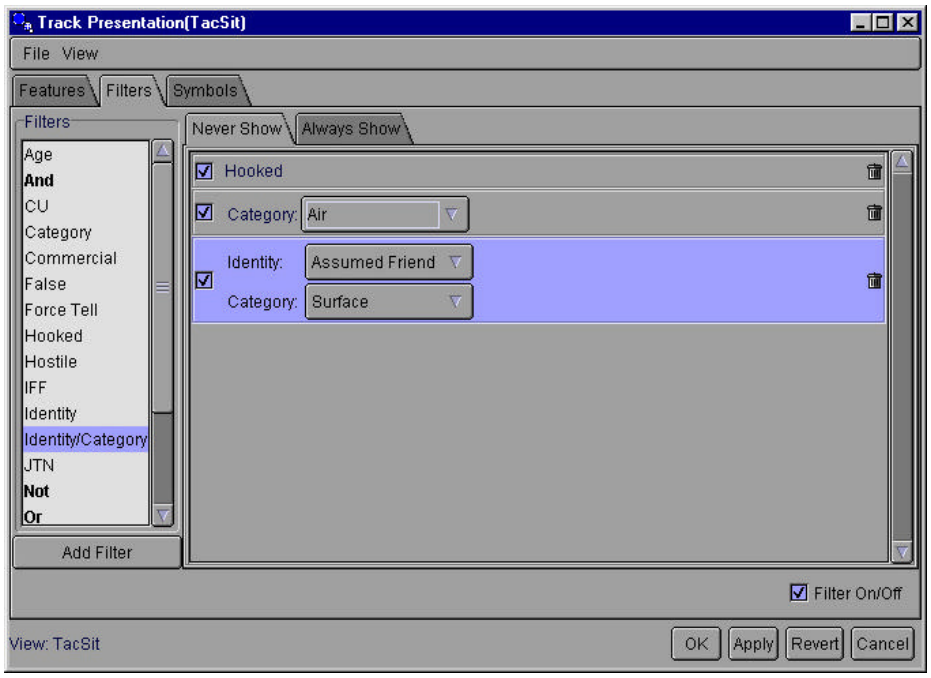

Figure 76. Track Presentation - Filters

4.4.4.2.1 Filters List

The Filters section includes filters, such as Category, Identity, IFF, Sensor, etc. These conditions are pluggable and extensible. Contact Solipsys for more information about additional plug-ins. A user must first select either the Always Show or the Never Show tab, depending on the change required. Always Show will always show a particular type of track. **Never Show** will never show it. **Never Show** is always processed before **Always Show** and will cancel out competing elements in **Always Show**. The **Force Tell** condition trumps all other filters.

After the expression has been chosen, an operator can select a filter from the Filter List, select either the Never Show or the Always Show tab, and then left-click the Add Filter button located beneath the list (or double left-click on the filter in the filter list). The filter will appear in the tab on the right side of the panel. The condition can then be refined, the category or identity can be selected, the IFF mode can be entered, etc. The refinement controls are condition-dependent; the options presented to the user are dependent on the type of condition. Filters can be easily removed by selecting their respective trash icon.

Using filters:

1. Select either **Never Show** or **Always Show**.
2. Double left-click (or left-click + press **Add**) on a condition, such as **Sensor**.
3. Select the Spy 1B radar in the pull-down menu.
4. Select Apply.

4.4.4.2.2 Simple and Complex

The Filter List contains two types of pluggable filters, simple and complex. These enable adjustment of track types on the main display. Simple filters usually require little user input, whereas complex filters require much more. A simple filter is displayed and refined in a single region. A complex filter is displayed in two portions: a description portion and a drop-down portion. The description portion allows the user to enter appropriate data into a field. The drop-down portion is accessed by selecting the arrow, which lies at the extreme left of the filter. A checkbox indicates the status to the user who can activate or deactivate any filter without removing it from the secondary box.

4.4.4.2.3 Logical Expressions

Logical or Boolean expressions permit the operator to make certain specific choices about the tracks displayed on the main display. All conditions on the top level of the expression builder are treated equally and are considered logically bound or 'Or-ed' together. These operators, And/Or/Not, create compound expressions: TDF 'And' MSCT, TDF 'Or' MSCT, one or the other, especially useful when one is not available, TDF 'Not' MSCT. The logical operators can be added to the configured list.

Using filters, logical operators and conditions:

1. Select either **Never Show** or **Always Show**.
2. Select logical operator, **Not**.
3. Double left-click on operator (or press **Add**). It should be highlighted in blue.
4. Double left-click on a condition, such as Identity/Category.
5. Select Suspect and Unknown in the pull-down menus.
6. Select **Apply**. These above choices state that, "TDF will never not show tracks that are suspect and unknown; it will always show them."

4.4.4.3 Symbol Sets

The Symbols panel (Figure 77) will appear by default when this application is opened. It allows the user to modify the symbol set used in the main display. By default, TDF supports several popular symbol sets, including Block, MCE, MIL-STD-2525a, MIL-STD-2525b, and NTDS. Because symbol sets are plug-ins, please contact Solipsys for new symbol set additions.

The symbol sets present the user with a variety of options that are easy to use. By selecting any symbol in the NTDS and MCE symbol sets, the operator can change the size (Large, Normal, and Dot) of these symbol sets based on the Model 5 taxonomy category and identity. The Block and MIL-STD-2525a symbol sets allow toggling between a large symbol and a dot. If a user left-clicks on a row or column, it will cause all symbols in the row/column to change in unison while a click on the unmarked region at the upper left of the table will change the whole table.

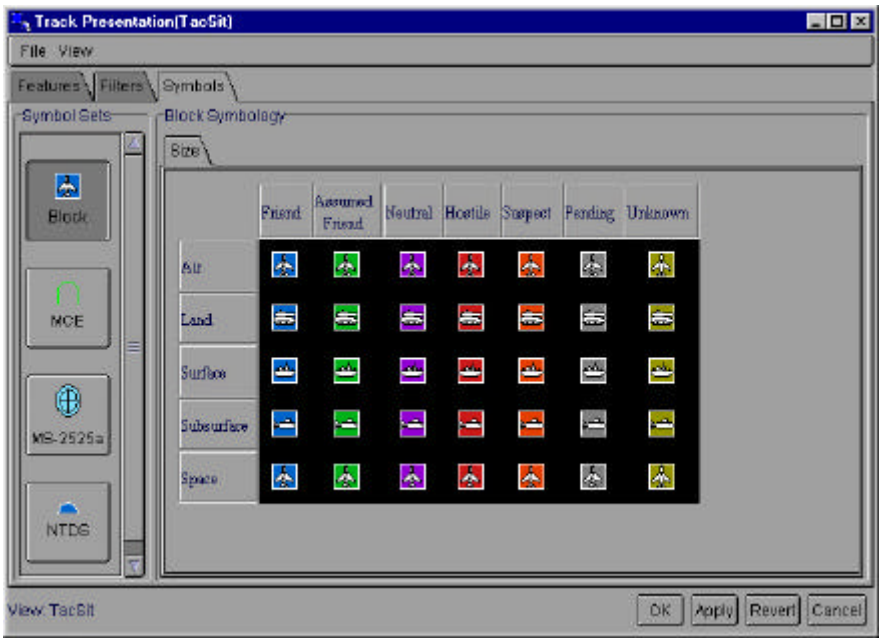

Figure 77. Track Presentation - Symbols

4.4.4.3.1 Block Symbol Set

The Block Symbol Set (Figure 78) can only appear as either a symbol or a dot. The user can change the size (large and dot) by clicking on the empty space between the row and column headings (top left). Select a row or column heading to change that entire row or column's size. Clicking on an individual symbol in the grid will change individual track types, such as Air/Assumed Friend.

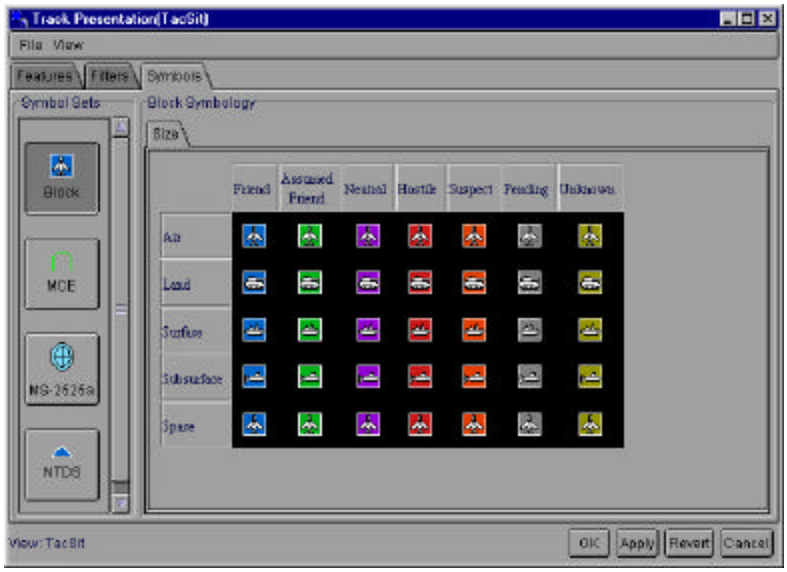

Figure 78. Track Presentation – Block Symbol Set

The user can change the color of these symbols by selecting the color tab. By left- or right-clicking on any color box to the left, an operator can access a color swatch and RGB slider to have an endless variety of color choices. For instance, a user can configure the color by source type (See Appendix B).

4.4.4.3.2 Mission Control Element (MCE) Symbol Set

The operator can change the symbols' size (large, small, and dot) by clicking on the empty space between the row and column headings (top left). Select a row or column heading to change that entire row or column's size. By clicking on the object with the mouse, it will change individual track types, such as Air/Assumed Friend (Figure 79).

The color of these symbols can be configured in the color tab. By left- or right-clicking on any color box to the left, the operator can access a color swatch and RGB slider to have an endless variety of color choices. For instance, the user can configure the color by source and radar source type (See Appendix B).

Configuring MCE Color:

1. Choose MCE in the available Symbol Sets.
2. Select the color tab.
3. Choose MCE in the pull-down menu.
4. Move slider from left (Darker) to right (Lighter).
5. Select Apply.

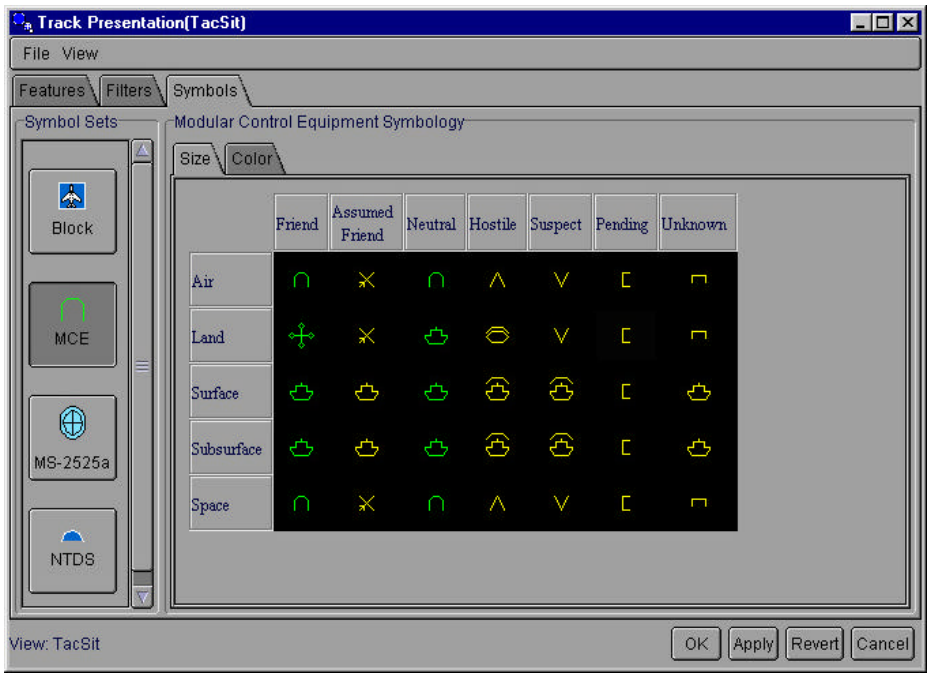

Figure 79. Track Presentation – MCE Symbol Set

4.4.4.3.3 MIL-STD-2525a Symbol Set

The MIL-STD 2525a (Figure 80) is the first of its kind, specifically created for coalition forces, nationally and internationally. The symbols can only appear as either a symbol or a dot. The user can change the size (large and dot) by clicking on the empty space between the row and column headings (top left). Select a row or column heading to change that entire row or column's size. Selecting an individual symbol in the grid will change individual track types, such as Land/Hostile.

The Color tab allows the user to color-code the symbol set with a property. For instance, the operator can choose colors to identify different sources available. The reported sources will cause History points to precede the track. The user can choose both Color By, which is the fill color and Outline By, which is the outline color (See Appendix B).

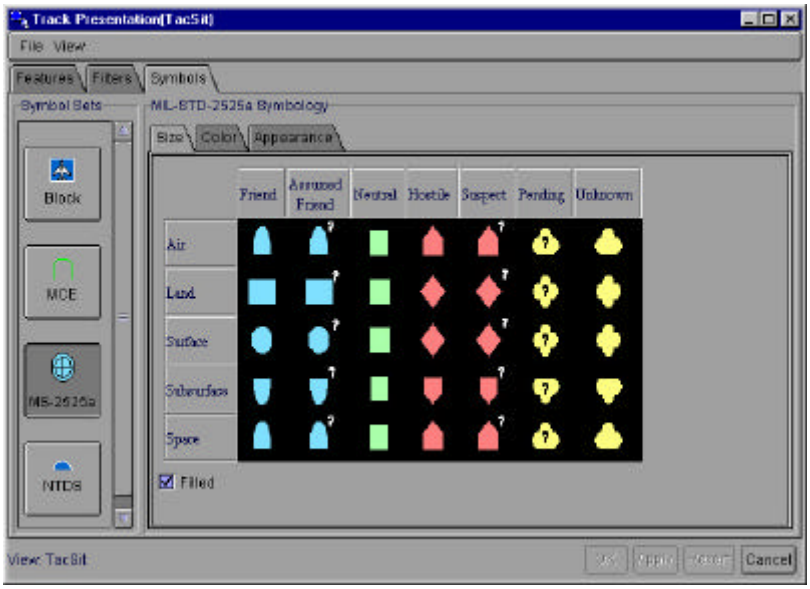

Figure 80. Track Presentation – MS-2525a Symbol Set

This symbol set uses both somewhat unusual shapes and imbedded icons to accurately display a track's attributes. The Appearance tab shown in Figure 81 provides the user the ability to choose how the symbol will appear and what icons will be used. The Sample box previews what changes have been made. If under the symbol, it reads, <Icons Off>, the operator can toggle it ON by enabling the icons-drawn box below.

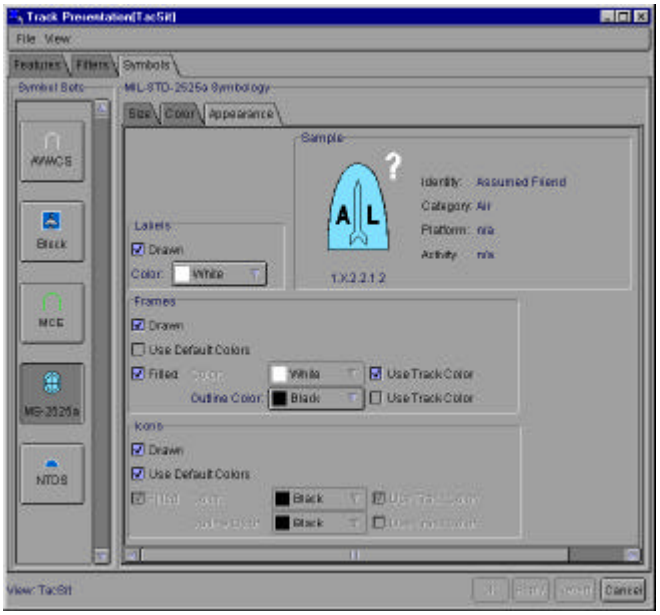

Figure 81. Track Presentation - Appearance

Table 24. Track Presentation Type and Related Actions

Type	Action	
Labels	Drawn	Toggles any text or symbol inside of the original symbol (internal symbol).
	Color	Changes color of text or symbol drawn in internal symbol.
Frames	Drawn	Toggles external symbol's frame.
	Use Default Colors	Uses default colors.
	Filled	Fills external symbol. Filled is automatically toggled on when drawn is chosen, can be toggled off to retain only a frame. The pull-down menus offer Color (fill Color) and Outline Color. Choose 'Use Track Color' to restore default colors.
Icons	Drawn	Toggles icon's frame.
	Use Default Colors	Uses default colors.
	Filled	Fills icon. Filled is automatically toggled on when drawn is chosen, can be toggled off to retain only an icon's frame. The pull-down menus offer Color (fill Color) and Outline Color. Choose 'Use Track Color' to restore default colors.
Sample	Uses selectable headings to cycle through symbols	

The Frames box enables/disables a frame around the icon via the drawn check box. In addition, the user can toggle the Fill Color of a frame around the icon. In the case of a multitude of tracks, it may be necessary to clean up the screen so use this symbol set without color fill. This helps prevent ocular confusion. Of course, the user can also remove the icons and change its fill color in the Icon box at the bottom of this pop-up screen. This could help one focus on a track's identity and not its platform.

Configuring a symbol:

1. Choose Drawn in the Frames section
2. Turn off Fill Color
3. Left-click on the pull-down menu called Outline Color and choose Outline Color (border)
4. Uncheck Drawn in the Icons section to eliminate all icons. The user has made a symbol with thin blue frames and no icons, useful to focus entirely on track identity.

4.4.4.3.4 MIL-STD-2525b Symbol Set

The MIL-STD-2525b is the next iteration of the 2525 series. The set, based on NATO STANAG standards, will replace MIL-STD-2525a as a common symbol set for US and coalition forces. Solipsys will include both 2525a and 2525b in the upcoming builds of TDF and

BattleLab. The Solipsys 2525b editor (Figure 82) found in the Track Presentation application implements this symbol set via a rule system. Please refer to the MIL-STD-2525b for any questions regarding Code implementation. Use the three tabs, Rule, Appearance, and Size, to configure the symbols.

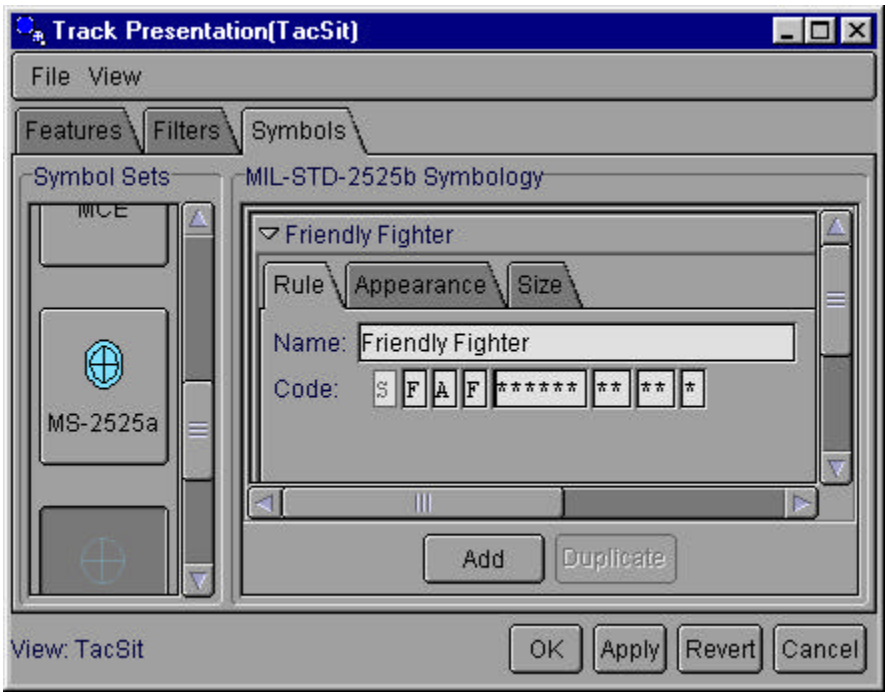

Figure 82. MS-2525b Editor – Rule Tab

Configuring Rule #1 (Figure 82):

1. Select MIL-STD-2525b from menu
2. Select the Rule tab
3. Left-click **Add** located at the bottom of the editor to add rule.
4. Select the arrow near Rule #1 to open the editor.
5. Rename Rule #1 to Friendly Air Fighter in the text field.
6. Enter code listed in MIL-STD-2525b.

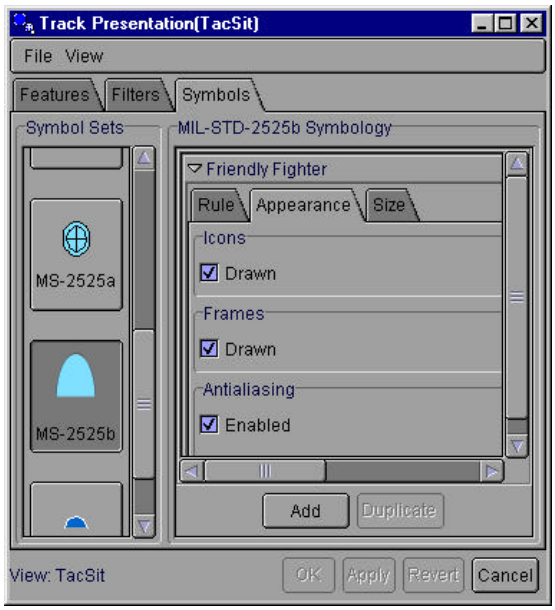

Figure 83. MS-2525b Editor – Appearance Tab

Configuring appearance (Figure 83):

1. Select the Appearance tab
2. Select Icons>>Drawn to display its center symbol, such as F for Fighter
3. Select Frame>>Drawn to frame the shape if it is an available option for symbol type
4. Enable **Anti-aliasing** to smooth the borders of each symbol. Figure 84 shows the effects of anti-aliasing

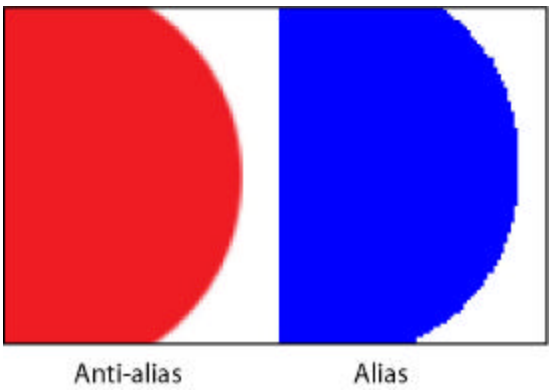

Figure 84. Anti-aliasing/Aliasing

Choosing a size (Figure 85):

1. Select the Size tab
2. Select Normal for immediate recognition of symbol
3. Select Dot to de-clutter screen

4. Select scale and use slider for shrinking or enlarging symbols

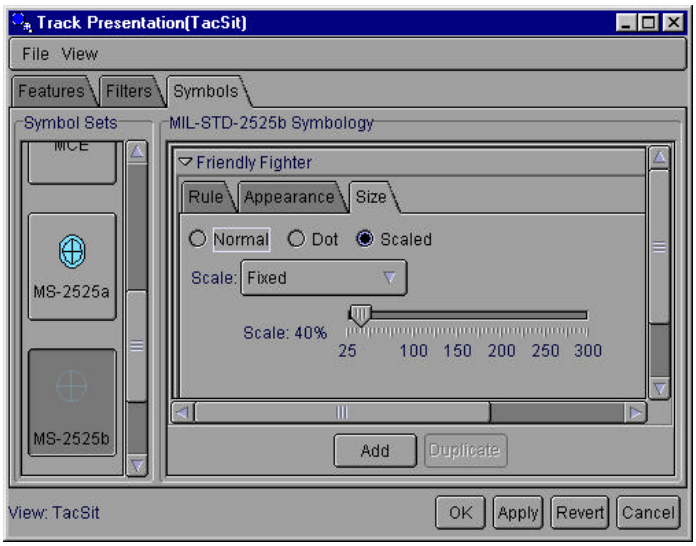

Figure 85. MS-2525b Editor – Size tab

Using new rules:

1. Choose Add to add a dissimilar rule
2. Choose Duplicate to reconfigure selected rule
3. Left-click on the trashcan to delete rule
4. Order rules sequentially. If two rules are similar and if the code (or condition) of the first one is met, the second rule will not be considered.

4.4.4.3.5 Naval Tactical Data System (NTDS) Symbol Set

The user can change the size (large, small, and dot) of NTDS (Figure 86) symbols by clicking the empty space between the row and column headings (top left). The size of symbols in a row or a column can also be changed by selecting the row or column heading. By clicking on the symbol, the user can change individual tracks in the symbol grid, such as Surface/Friend. The Fill Color check box toggles fill color on and off.

The color of these symbols can be configured by selecting the color tab. By left- or right-clicking on any color box, the operator can access a color swatch and RGB slider for an endless variety of color choices. For instance, an operator could color a symbol set to show a track's radar source type.

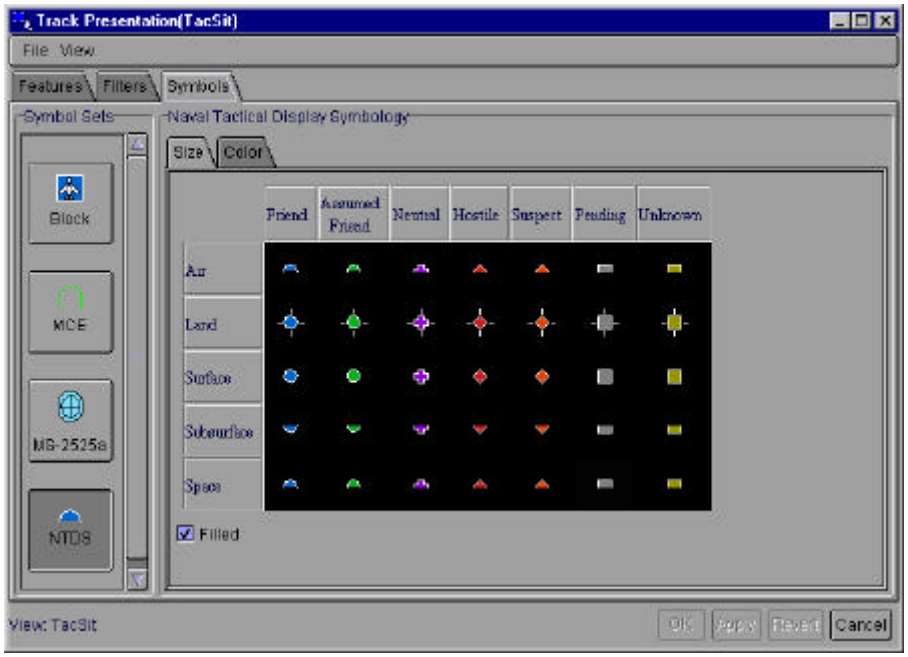

Figure 86. Track Presentation – NTDS Symbol Set

4.4.5 Track Recorder

The Track Recorder (Figure 87) provides the user a configuration similar to home electronics to record and playback track scenarios (known as Solipsys-designed data extracts or DXs). All selections made will be reflected in the Track Recorder status screen. In addition to basic recording and playback, the application has an option to playback the recording at .25X to 10X normal speed. Track record and playback are independent and can be executed simultaneously. By clicking in the Record filename field, the operator can change the name of a file being recorded.

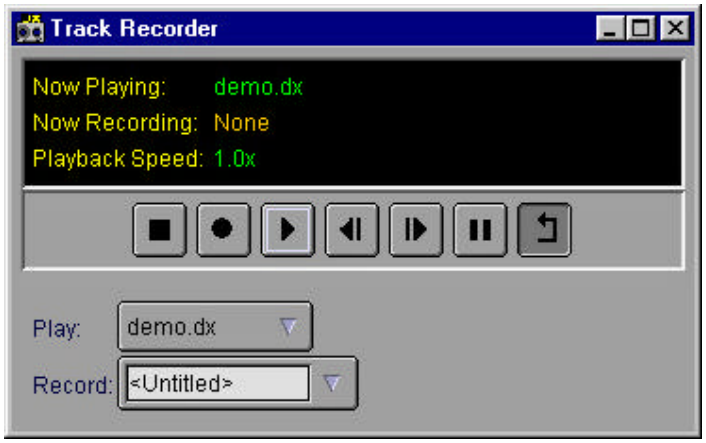

Figure 87. Track Recorder

4.4.6 Sensor Presentation

The Sensor Presentation (Figure 88) application controls the dynamic display of correlated and uncorrelated radar hits and IFF signals. The sensor presentation can use any sensors included in the Multi Source Correlator Tracker (MSCT) and any other data sources networked. All available sensors are listed to the left--Alpha, Bravo, etc. Use the Master Visibility checkbox to disable all sensors.

Radar hits, beacon hits, and reinforced hits (beacon hits with a skin painting) can be configured in the sensor presentation for display on the main display. These symbols can be changed according to correlated and uncorrelated hits.

Three very useful options appear at the top of the panel: Master Visibility - toggles all history off/on; Visibility Cutoff - configures the distance at which sensors stop displaying; Open Edit >> Global Options – provides a slider that globally (the network distribution) changes how much history is shown by each sensor.

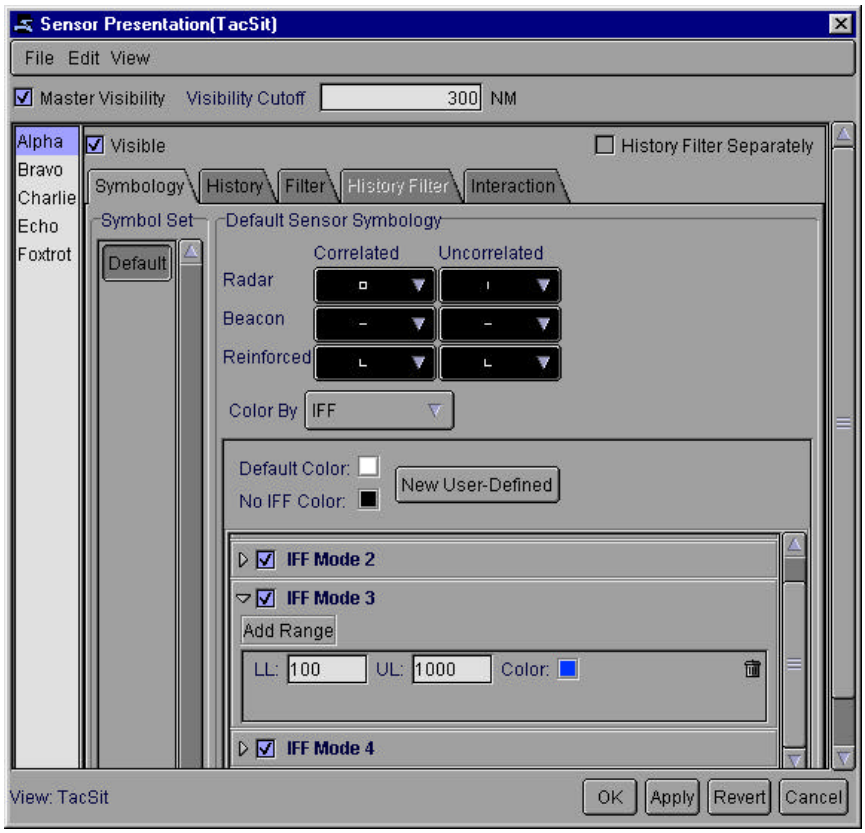

Figure 88. Sensor Presentation

History points are controlled by the History tab. If history is turned off, the less recent history in the Sensor Presentation will not appear. In the History tab, there are five History choices accessible via the pull down menu:

Choosing a history type:

1. Cycling: Cycles from front to back on sensor trail
2. Fade: sensor hits only stay active for a small period of time
3. No History: Does not display history
4. Pulsate: Blinks through sensor trail and blinks entirely off for a extremely short period
5. Ripple: Also blinks through entire trail but stays lit

Using the Interaction tab:

- Selectable: Shows sensors when hooked. Useful for decluttering, but not helpful if sensors are active for all tracks.
- Rollover: When the pointer grazes over a track, sensors are displayed.
- Interact with Current Only: Only allows interaction within a certain range. Right-click on NM to change the measurement.

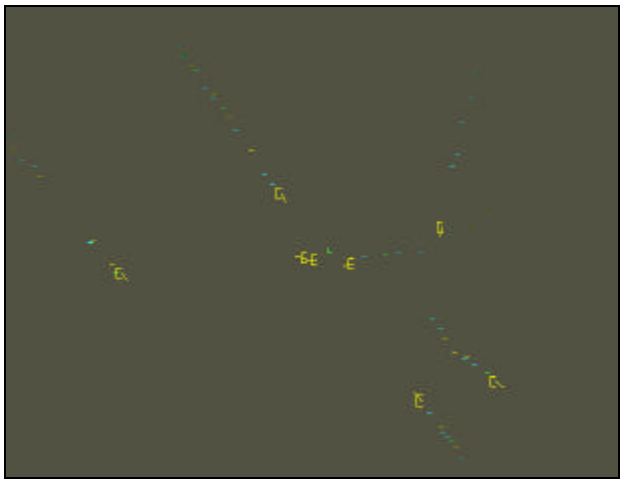

Figure 89. Sensor example

Creating a sensor configuration:

1. Choose a sensor in the list.
2. Left-click on Color square to change it to blue, for instance.
3. Toggle Filter History Separately if necessary.
4. Select the History tab.
5. Select Ripple from pull down menu.
6. Use slider to pick an appropriate speed.
7. Press implementation button, Apply.
8. See the result in Figure 89.

4.4.7 Filters

The third and fourth panels are present to filter the tracks from the main display. The fourth only deals with the history plots whereas the third filters all sensor hits. Filters enable an operator-chosen variety of conditions and logical operators to narrow the track information to the most useful tracks. The Filters here operate just like the filters in Track List and the Track Presentation.

The Filter Display contains two tabs, Always Show and Never Show, which allow the operator to narrow tracks through use of these tabs and filters. A useful technique to display only one or a few categories of tracks is to use the Boolean expression, **not**, on the **Never Show** Tab.

Filtering a sensor source:

1. Choose either Filter tab.
2. Select Never Show.
3. Double left-click on a filter, use Beacon.
4. Select Apply. Now, no beacon sensor hits will appear on the display

4.4.8 Track Counts

The **Track Counts** (Figure 90) produces a grid of information to number how many tracks of a certain type are currently displayed. This application has four tabs: Track Counts, Rows/Columns, Global Filters, and Options. The Track Counts tab is the grid that contains the track numbers. The Update Now button at the bottom of the window will do just that; it will update the tracks immediately no matter what the update rate. By default, tracks are numbered by two values, **Category** and **Identity**. Altering the axis (x, y) values is accomplished in the next tab, Rows/Columns.

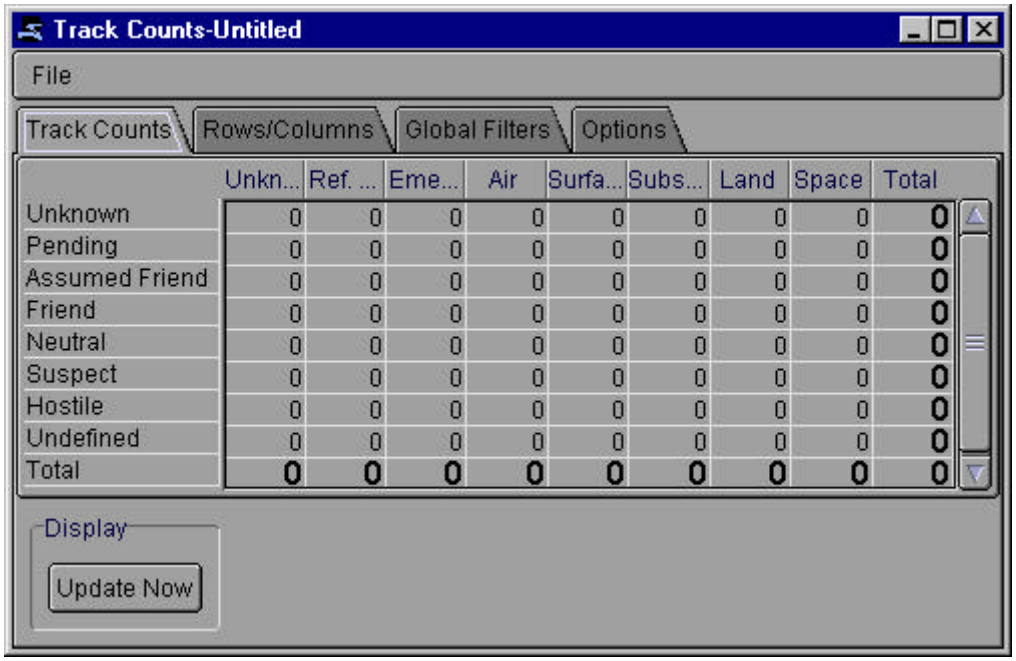

Figure 90. Track Counts

4.4.8.1 Rows/Columns

The Rows/Columns tab can be configured to include many different conditions and logical operators.

Changing the row and column headings:

1. Choose Rows/Columns tab.
2. Choose several headings.
3. Hold <Shift> + left-click on more than one heading to get all consecutive headings.
4. Select **Add** in the Rows or Columns box.
   Or
3. Hold <Ctrl> + left-click to choose headings singularly.
4. Press **Add** in the Rows or Columns box.

Changing a heading's name:

1. Select a heading in a Row or Column Box.
2. Enter in a new name in the row or column text field at the bottom of the window.

4.4.8.2 Global Filters

The Global Filters tab (Figure 91) enables a user to specify what tracks are displayed in the Track Counts grid. By default, true is set as a default filter in the Count tab, which should be

understood as Count Only. The Never Count tab filters out all the tracks that are identified through the addition of filters.

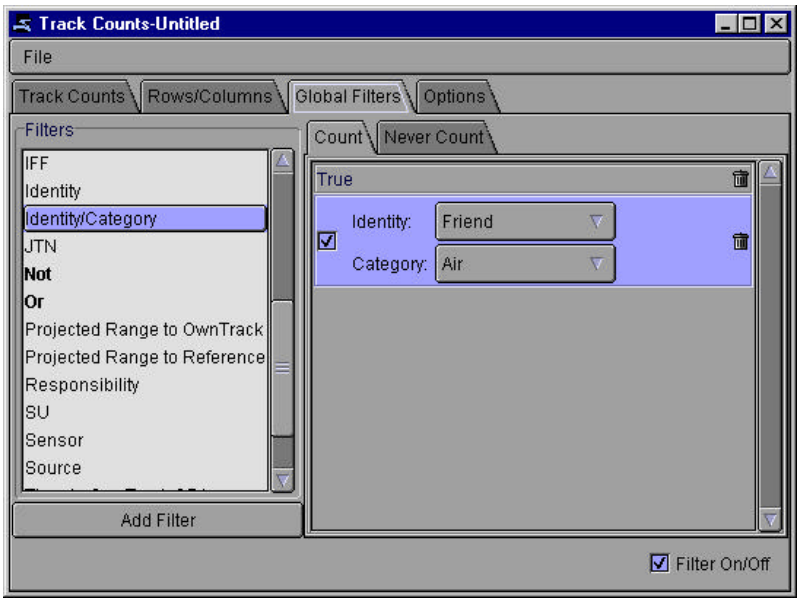

Figure 91. Track Counts – Global Filters

Changing the row and column headings:

1. Left-click on filter + press **Add Filter** (double-click).
    a. Hold <Shift> + left-click on more than one heading to get all consecutive headings.
    b. Select **Add** in the Rows or Columns box.
    Or
    c. Hold <Ctrl> + left-click to choose headings out of order.
    d. Press **Add** in the Rows or Columns box.
2. Select appropriate choice in pull-down menu if necessary.

Changing the order of the table items, simply:

Left-click and drag the property from one position to another.

4.4.8.3 Options Editor

The Options Editor (Figure 92) utilizes a slider, so the user can change the update time for the Track Counter. Moving the slider to the right will lengthen the update rate and moving it to the left will shorten the update rate. If an operator toggles the Auto Update off, the Track Counter will not update unless the Update Now on the Track Counts tab is selected.

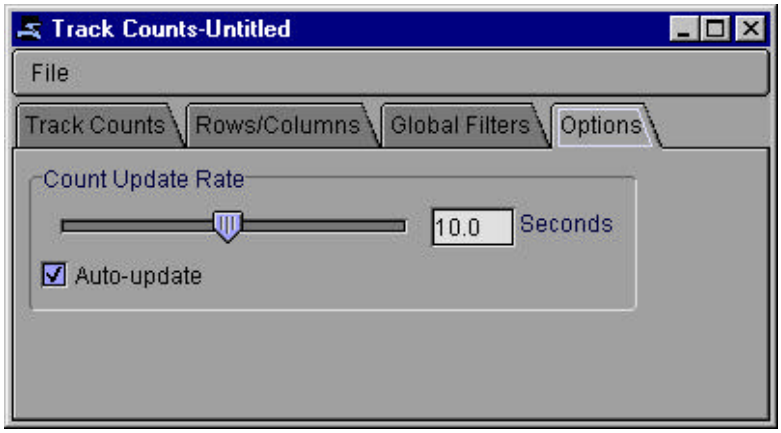

Figure 92. Track Counts – Options Editor

4.4.9 Track List

The Track List (Figure 93) pop-up window appears under Tracks on the menu bar. The List provides an inventory of all objects available on the main display. This window includes an application-specific menu and three tabs, Content, Filters, and Options.

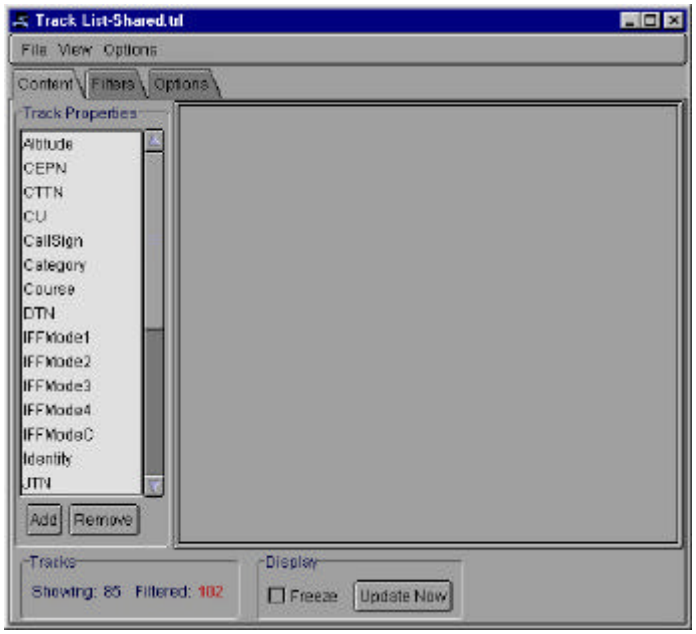

Figure 93. Track List

4.4.9.1 Options Menu

The Options menu enables the operator to configure the Track List. Selecting Properties will remove the list of track properties to the left of the screen. Disabling Status will turn off the Status Footer at the bottom of the screen. Selecting Hide All Controls does just that, it hides all controls, everything except for the Content Display.

4.4.9.2 Content

Under the default tab, Content (Figure 94), the user will see the Track Property List, Content Display, and Status Footer. Completely pluggable, the Track Property List on the left of the Content Display enables a variety of plug-ins to be added to the Content Display. The Content Display is a list of all tracks (objects) available, and the recipient of any changes made elsewhere in the Track List. No filters used in the Track List will be used in processing tracks on the main display.

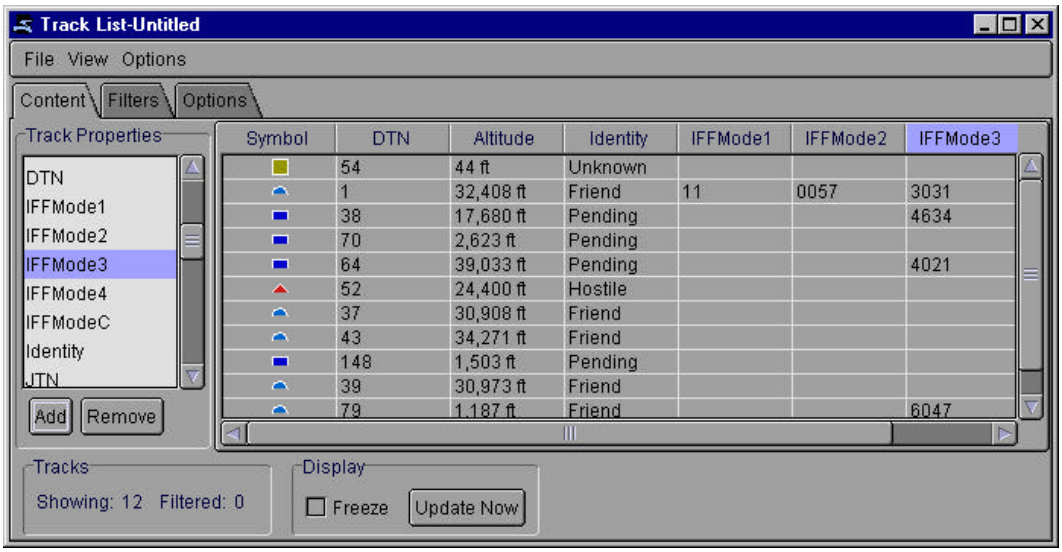

Figure 94. Track List - Content Display

Adding and Removing Property to the Content Display:

1. Left-click on filter selection + press **Add** or **Remove** (double-click).
   Or
2. Hold <Shift> + left-click on more than one heading to get all consecutive headings.
3. Press **Add** or **Remove**.
   Or
4. Hold <Ctrl> + left-click to choose headings out of order.
5. Press **Add** or **Remove**.

4.4.9.2.1 Content Display

The Content Display, shown in Figure 95, permits varied manipulations to the data. A left-click and drag of any highlighted column heading will alter its position. A right-click on the heading provides a cascade menu displaying commands, Insert, Remove, and Sort. **Insert** adds columns while **Remove** subtracts them from the Content Display. **Sort** permits the user to sort the entirety of the track list based on the chosen column's attributes in ascending (0-10) or descending (10-0) order. The chosen column's heading will be emboldened and have an arrow on the right of the heading box, which designates the direction of sort. Only one column may be sorted at a time.

4.4.9.2.2 Operations Menu

The Operations Menu will contain many different capabilities depending on the configuration. Yet, there are four default commands, Hook, Unhook, Hide, and Show All, on the right-click operations menu (also Figure 73) that are included in all configurations. These commands permit grouping and filtering options. The first two commands, **Hook** and **Unhook**, permit the operator to group the tracks using point and click methods discussed earlier. The Primary hooking color-code is tan, and the Secondary hooking color-code is green. While the hooking commands directly reflect what is occurring in the main display and vice versa, the Track List filters and the main display filters are completely independent of each other. The **Hide** command filters all selected or unselected tracks, as appropriate. The numbers filtered and shown are listed in the **Status Footer** while **Show All** in this cascade menu will undo this filter. Some of the operations menu selections may not be available in certain TDF configurations.

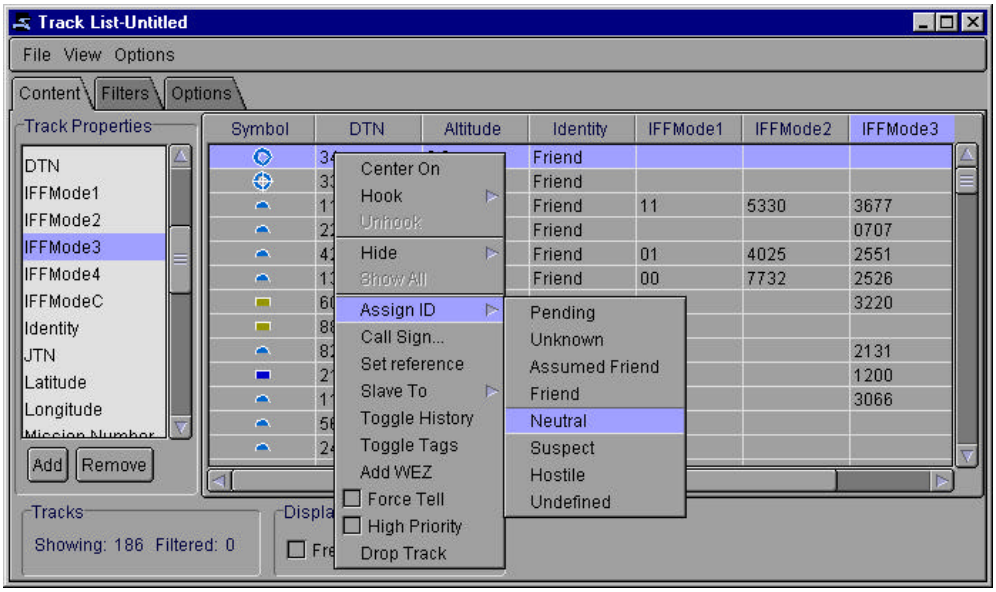

Figure 95. Track List – Operations Menu

4.4.9.2.3 Status Footer

The Status Footer includes Tracks, a small box numbering Showing and Filtered tracks; and Display, which permits controlled updating and freeze screen capabilities. This gives an operator time to deliberate on choices before the tracks in question change position in the continuously updating Content Display. Without freeze screen, the rows of tracks will move throughout the list according to that track's attributes.

4.4.9.2.4 Filters

The second panel, Filters (Figure 96), offers the ability to remove any tracks from the Content Display deemed unnecessary to the operator. Filters narrow the track information to the most useful tracks. The Track List Filters operate in the same manner as the filters in the Track Presentation, but as mentioned above, are completely independent of each other.

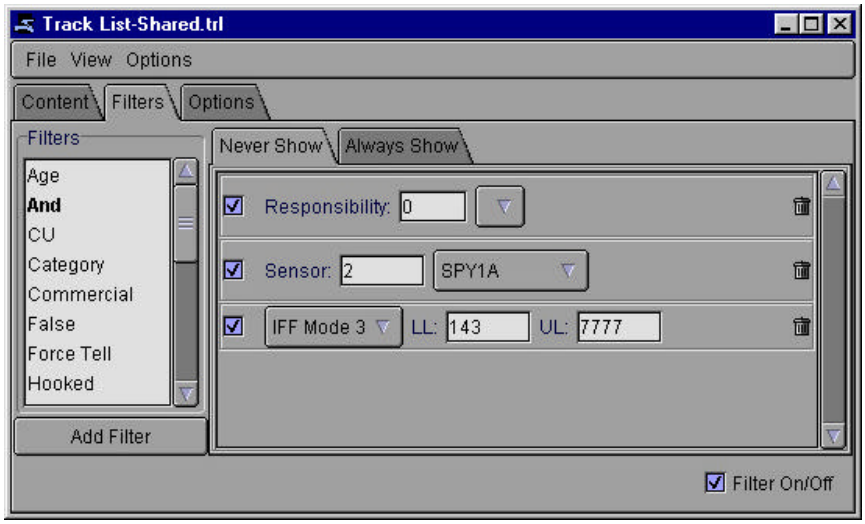

Figure 96. Track List – Filters

The Filter Display contains two tabs, Always Show and Never Show, which allow the operator to narrow tracks through use of these tabs and filters. A useful technique to display only one or a few categories of tracks is to use the Boolean expression, **not**, on the **Never Show** Tab. The Always Show tab lists Hostile and Force Tell objects by default.

4.4.9.3 Options

The last tab on the Track List is the Options (Figure 97) panel, which enables the operator to control screen updates and sort options. The slider on the top permits the operator to change the update rate from one second to 120 seconds. The first check box, Update immediately on Track Add/Remove, will cause the Track List application to update its display whenever a track is added or removed from the system, rather than waiting until the update time interval on

the slider is reached. The last check box, Nulls Sorted High, causes a column to remain at the end of an ascending sort.

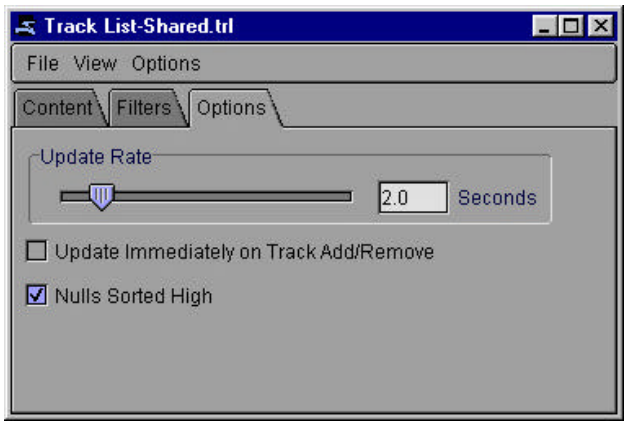

Figure 97. Track List – Options Panel

This section describes the steps required to create a sample Track List.

Making a Track List:

1. Select new track list from the file menu.
2. Double left-click on desired properties from the Track Properties List. The Symbol property is useful to compare with the main display.

Or

1. Hold <Shift> + left-click on more than one heading to get all consecutive headings.
2. Press **Add**.

Or

1. Hold <Ctrl> + left-click to choose headings out of order.
2. Press **Add**.

Adjusting the Columns:

1. Left-click on a column header and hold.
2. Drag it to the to the left or right.
3. Drag the column's left or right margins to resize.

Adding and Removing:

1. Right-click on the column header.
2. Select **Insert** from the pop-up menu.
3. Select a property to insert from the pop-up menu.

Sorting by a Track Property:

1. Double left-click on the column header until the right sort direction is achieved.

Or

2. Right-click on the column header.
3. Select the desired sort option from the pop-up menu.

Hooking tracks:

1. Select a few rows from the table by Ctrl + left-clicking on them.
2. Right-click anywhere on the highlighted region.
3. Choose **Hook** selection from the pop-up menu.
4. Choose **Primary** (Tan) or **Secondary** (Green) from the sub-menu. The rows hooked in the Track List should also be visibly hooked on the main display.

Freezing and hooking tracks:

1. Toggle **Freeze** in the status footer to ON.
2. Right-click anywhere on the highlighted region.
3. Choose **Hook** selection from the pop-up menu.
4. Toggle **Freeze** OFF. Tracks will not update when frozen.

4.4.10 Track Options

The Track Options (Figure 98) application directly affects applications that use track conditions and filters, allowing the user to add, remove, and edit information relating to Cooperating Unit (CU), Sensor Unit (SU), and Reporting Responsibility (RR). This is a convenient application for mapping numerical values to string names for greater reader comprehension. These values are then used by other applications. For example, by assigning names to each sensor unit, the user can configure the history application to color code the units by the sensor names for a more meaningful representation.

This application has a menu bar at the top of the panel. The panel is split in two: a list of editable items on the left, and an editor area on the right. Selecting an item in the list displays its editor in the area to the right.

Figure 98. Track Options

Adding a new track:

1. Select CU, SU, or RR.

2. Select Add.
3. Enter new track information into the pop-up window.
4. Choose Duplicate to make a copy of a pre-existing track.
5. Use a number different from the original in the dialog box.

Editing a row:

1. Double left-click on desired cell to edit directly.
   Or
2. Choose **Edit** near the bottom.
3. Type in new values into pop-up window.
4. Select **Delete** to automatically delete without a confirmation window.

4.5 View

The following applications are available under the View pull-down menu on the menu bar.

4.5.1 Key Bindings

In the View Keys (Figure 99) application, the user can enter up to two new shortcuts. These shortcuts can be called from the main display, but they will not work if another application is active.

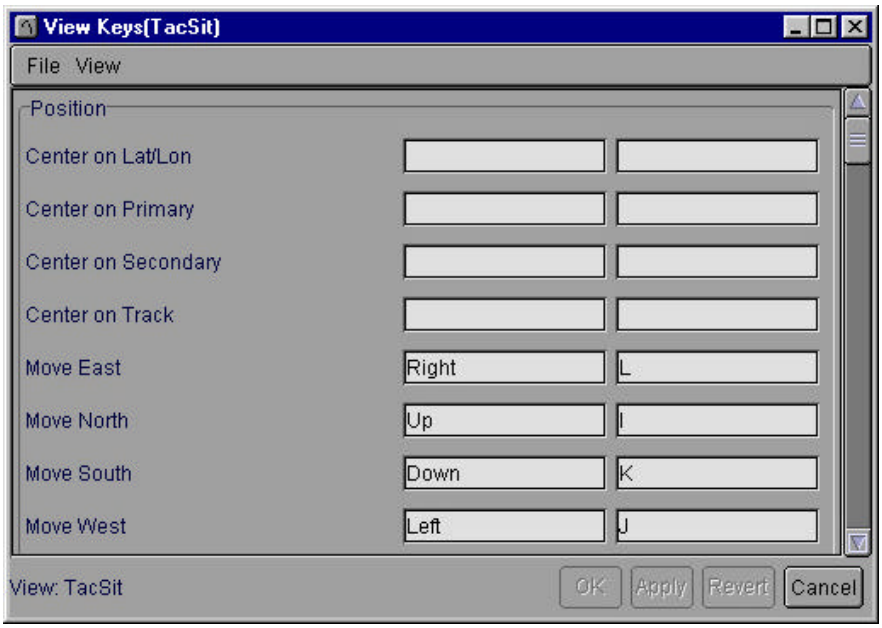

Figure 99. View Keys

Changing a shortcut:

1. Left-click inside either field to the right.
2. Press the letter or use a combination, such as <Shift> + T. This automatically deletes original shortcut. Forced capitalization is in effect.

4.5.2 View Locator

The View Locator (Figure 100) application provides the user with a simple database of previously stored geographical locations. The Locator is accessible by using the shortcut, Shift + L (default), selecting View Locator from the menu bar, or pressing the globe icon in the control bar. The user can offset to previously stored locations by either double left-clicking on the location entry in the scrolled list or highlighting the option and pressing the Go To pushbutton.

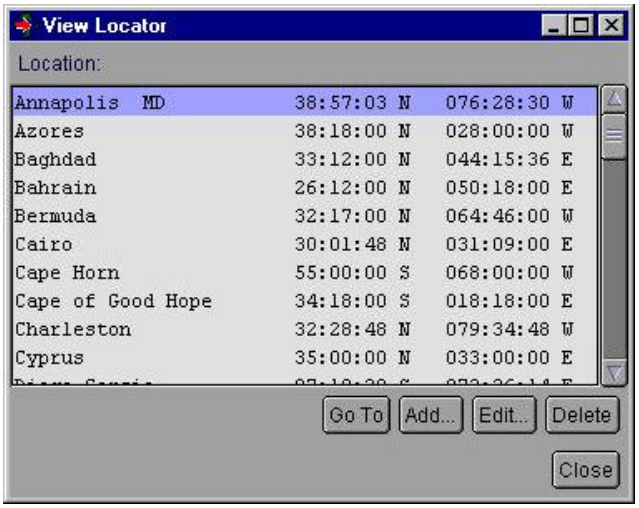

Figure 100. View Locator

Saving locations to the database:

1. Press the **Add** pushbutton.
2. Enter appropriate name and lat/lon information into the dialog box shown in Figure 101.

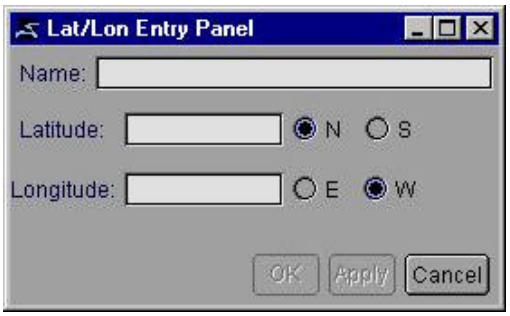

Figure 101. View Locator – Add

The application also provides the ability to modify and delete locations selected in the scrolled list.

5 HELP

5.1 Help Viewer

The Help Viewer (Figure 102) is an application that runs inside of TDF. It has helpful hints regarding every part of TDF although it does not include techniques and strategies for more complex usages.

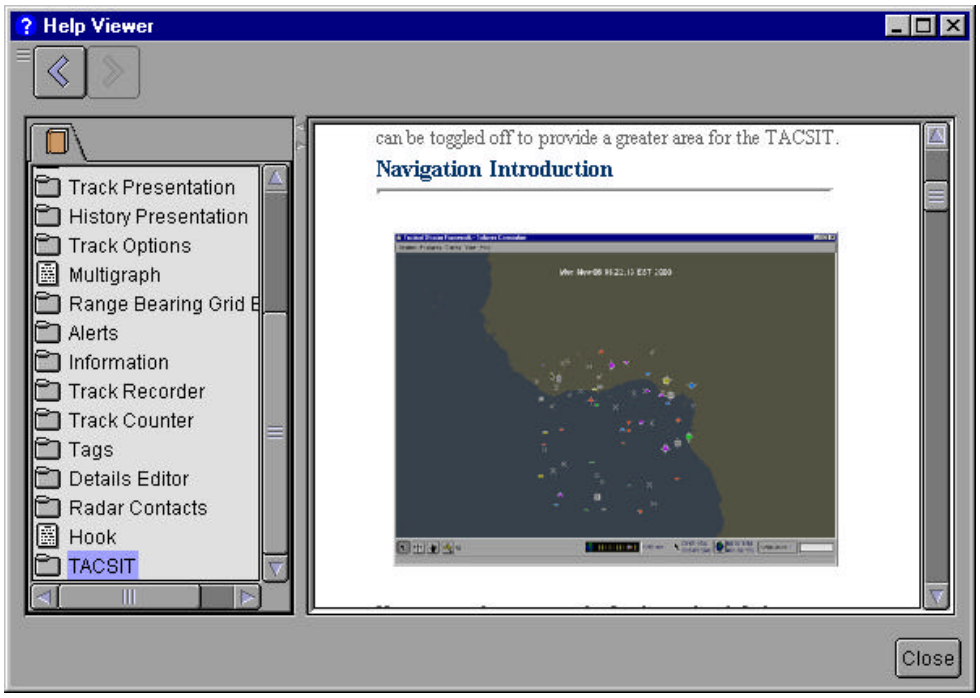

Figure 102. Help Viewer

5.2 About TDF

The About (Figure 103) application presents the user with a three-tabbed card that indicates the current version of the TDF software being executed, a scrolled list of the release notes associated with the build, and the software license agreement.

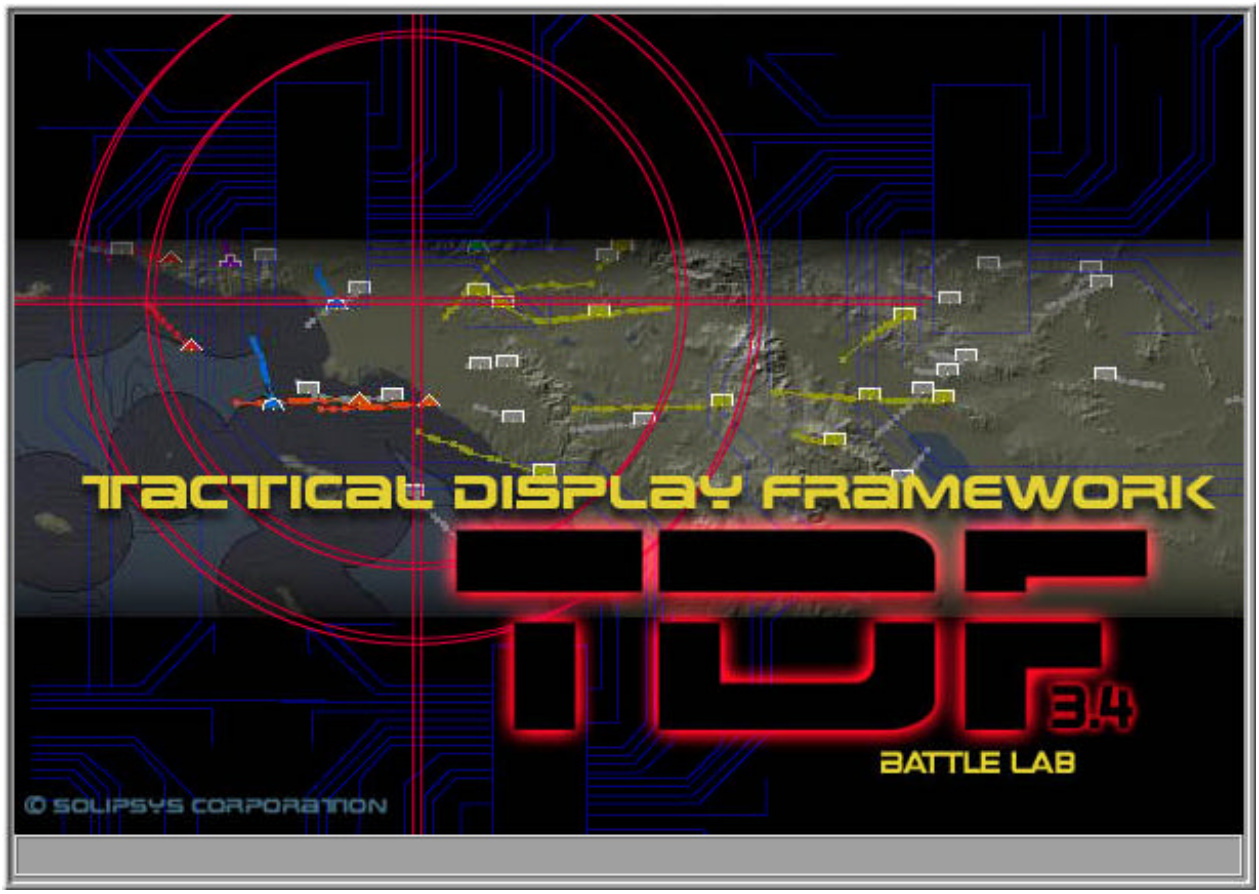

Figure 103. Version

6 DATA EXTRACTOR

The data extractor is a standalone application that transfers several different types of NIMA-standard maps from a CD to a computer (Figure 104). It supports:

- CIB - Controlled Image Base
- CADRG - Compressed ARC Digitized Raster Graphics
- DTED - Digital Topographic Elevation Data
- ADRG - ARC Digitized Raster Graphics

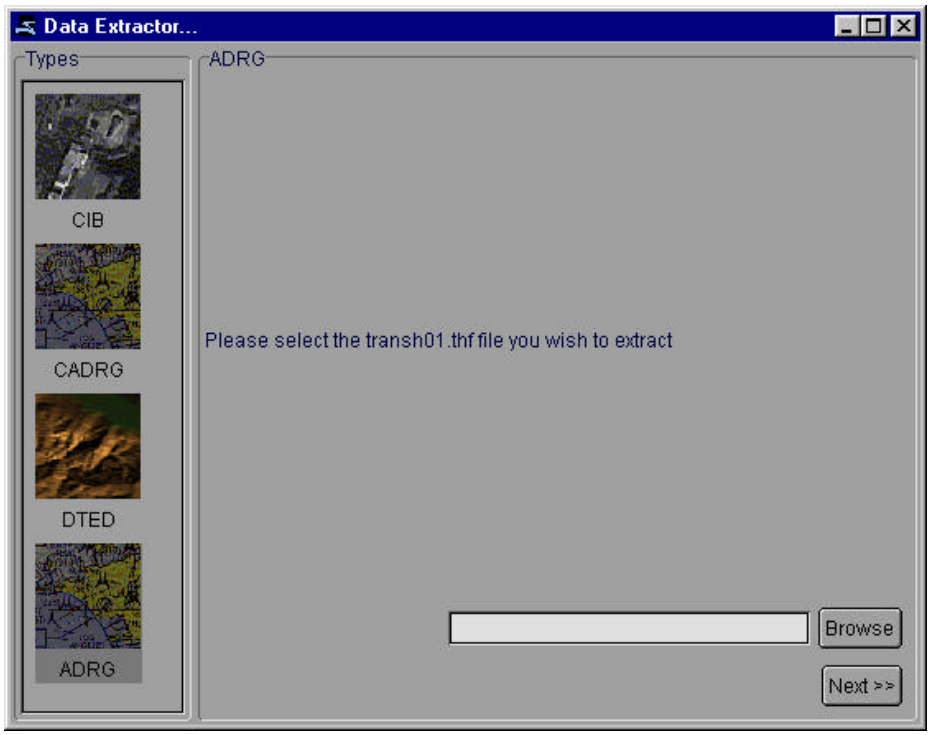

Figure 104. Data Extractor

Starting the Data Extractor:

1. Locate the Solipsys/Tdf/bin directory in My Computer or a similar application
2. Right-click on extractor.bat and drag on to desktop
3. Select Create Shortcut from menu
4. Double-click on the extractor.bat shortcut

Extracting a map--ADRG:

1. Highlight a ADRG
2. Use browse and select a new location for the maps
3. Left-click Next

Select tile(s) and choose an option:

1. Compressed: Reduces file size but increases file access time. In other words, the file is smaller but it will take longer to load it.
2. Transparency: It can clarify an image by transforming black pixels
3. Left-click Next

Use sliders to choose:

1. Levels of Detail (1-20) - Level of detail determines the quality of teh imagery when display on TDF. A high level of detail takes a much longer time to extract. As scale decreases the level of detail decreases.

2. Down sample Percent – Down sampling is a form of compression. It reduces the resolution of an image by replacing that area with a pixel of the averaged color. It combines pixels to reduce file size but also decreases image quality. The higher the percentage the more pixels are down sampled.
3. Left-click Next

Select Browse:

1. Highlight the correct directory and left-click on Open
2. Or write in a path name: i.e. \\Solipsys\Battlelab3.3-Developer\data\geo
3. A user must write this data into Solipsys\TDF\data\geo it will not be able to access it
4. Left-click Extract

While a user waits, the extractor analyzes, writes initial data, and then writes the Level of Detail chosen earlier. Shortly after progress meters are full, an extract button appears in the lower right of the panel. This indicates that the maps have been fully extracted.

5. Finally, left-click on the Extraction Done button in the lower left

7 NOTES

7.1 List of Acronyms and Abbreviations

ADRG	Arc-Second Raster Chartmap (ARC) Digitized Raster Graphics
ATO	Air Tasking Order
AWT	Abstract Windowing Toolkit
CANTCO	Cannot Comply
CANTPRO	Cannot Process
CADRG	Compressed ARC Digitized Raster Graphics
CCRO	Close Control Read-Out
CDF	Concept Development Facility
CDK	Common Display Kernel
CEC	Cooperative Engagement Capability
CEPN	Cooperative Engagement Processor Number
CIB	Controlled Image Base
CORBA	Common Object Request Broker Architecture
CPOD	Communications Plan of the Day
CSIL	Commercial Satellite Imagery Library

CTRL	Control Key
CU	Cooperating Unit
CUTN	Cooperating Unit Track Number
DDS	Data Distribution System
DFAD	Digital Feature Analysis Data
DNC	Digital Nautical Chart
DTED	Digital Terrain Elevation Data
DTN	Display Track Number
DX	Data Extraction or Data Extract
EW	Electronic Warfare
FAA	Federal Aviation Administration
GUI	Graphical User Interface
HAVECO	Have Complied
HSB	Hue/Saturation/Brightness
ID	Identification
JDK	Java Developer's Kit
JFC	Java Foundation Classics
JTN	Joint Track Number
LED	Light-Emitting Diode
MSCT	Multi Source Correlator Tracker
NIMA	National Imagery and Mapping Agency
NTDS	Navy Tactical Data System
ORB	Object Request Broker
PU	Participating Unit
PUTN	Participating Unit Track Number
RGB	Red/Green/Blue
STN	System Track Number
TACSIT	Tactical Situation Awareness Area
TDF	Tactical Display Framework
VCR	Video Cassette Recorder

VM	Virtual Machine
WILCO	Will Comply
WVS	World Vector Shoreline

APPENDIX A – FILTERS AND PROPERTIES

Table A. Filters

Filter	Action	
Age	The time the track has been available based on the update time.	
Category	A type of track, such as Unknown, Reference, Emergency, Air, Surface, Subsurface, Land, Space, Electronic Warfare.	
Commercial	Any commercial aircraft in a specified region.	
CU	A Cooperating Unit in the Cooperative Engagement Capability (CEC).	
Force Tell	In the Tactical Data Links, Force Tell forces a track through controllable receive filters.	
Hooked	Object(s) selected by the user.	
Identity	Track Identity:	Identity Defined:
	Pending	An evaluated track not yet identified although it has been through the identification process.
	Unknown	A track not yet subjected to the identification process.
	Assumed Friend	A Track assumed to be friendly because of its Characteristics, Behavior or Origin.
	Friend	A Track belonging to a declared, friendly nation.
	Neutral	A track whose Characteristics, Behavior, Origin, or Nationality indicates that it is neither supporting nor opposing friendly forces.
	Suspect	A potentially dangerous track because of its Characteristics, Behavior, Origin or Nationality.
	Hostile	A track eligible for engagement.
Identity/Category	A combination of Track Identity and Track Category.	
Identify Friend or Foe (IFF) Mode	IFF Mode 1	Mission
	IFF Mode 2	Military Aircraft
	IFF Mode 3	Commercial Aircraft

Filter	Action	
	IFF Mode 4	Interrogation – Not interrogated/No Statement; Interrogated/No response; Interrogated/Invalid response; Interrogated/Valid Response
Reporting Responsibility	Tactical Data Links – The Joint Unit (JU) reporting a track on the data link.	
Sensor	A Contributing Cooperative Engagement Capability (CEC) sensor.	
Source	The originating source of track (CEP, Flyte, TADIL A, TADIL B, TADIL J, GBDL, PPDL, IBDL, ADSI, MSCS, TIBS, TRAP, INET, SABER, OTH, etc.)	
Sensor Unit	A method to uniquely identify homogenous Air Traffic Control radars.	

Many track properties are also track filters. The following is a list of additional properties found in such applications as Track List.

Table B. Properties

Property	Action
CEPN	Cooperative Engagement Processor Number.
DTN	Display Track Number is a unique track number assigned by the Server, MSCT.
Course	The equivalent of Heading.
JTN	Joint Track Number.
SBTN	Saber Beacon Track Number.
Symbol	Operators can select symbol sets via the Track Presentation. Typically, a symbol set defines a unique symbol for each object defined with a Category/ ID classification. Some symbol sets add modifiers to symbols based on the state of an object, such as the modifiers added to emergency tracks in a Mission Control Element (MCE) symbol set. Other symbol sets can take advantage of amplification data provided over Tactical Data Links, such as Platform, Activity, and Specific Type. In the Mil-Std 2525A symbol set, a track identified as a Fighter and a F-15 Eagle has an icon representing both of these attributes.

APPENDIX B – COLOR CODING

Table C. Color Coding

Color Coding	Action	
CU (Cooperating Unit)	The operator can color code vehicles participating in the Cooperative Engagement Capability (CEC) Cooperating Units network.	
Category	A type of track, such as Unknown, Reference, Emergency, Air, Surface, Subsurface, Land, Space, Electronic Warfare	
Identity	Track Identity:	Identity Defined:
	Pending	An evaluated track not yet identified although it has been through the identification process.
	Unknown	A track not yet subjected to the identification process.
	Assumed Friend	A Track assumed to be friendly because of its Characteristics, Behavior, or Origin.
	Friend	A Track belonging to a declared, friendly nation.
	Neutral	A track whose Characteristics, Behavior, Origin, or Nationality indicates that it is neither supporting nor opposing friendly forces.
	Suspect	A potentially dangerous track because of its Characteristics, Behavior, Origin or Nationality.
	Hostile	A track eligible for engagement.
Identity/Category	A combination of Track Identity and Track Category.	
Identify Friend or Foe (IFF) Mode	IFF Mode 1	Mission
	IFF Mode 2	Military Aircraft
	IFF Mode 3	Commercial Aircraft
	IFF Mode 4	Interrogation – Not interrogated/No Statement; Interrogated/No response; Interrogated/Invalid response; Interrogated/Valid Response

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